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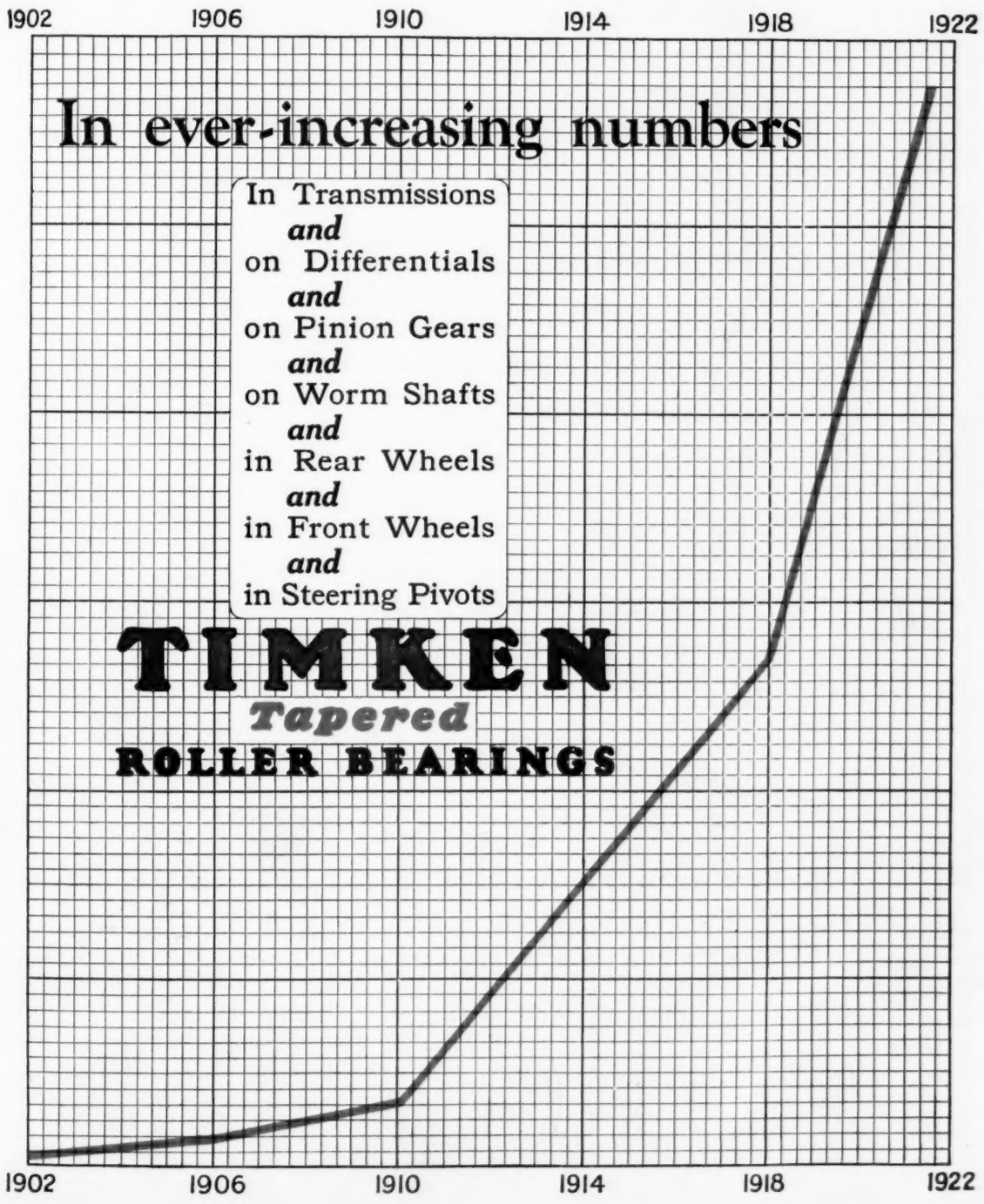

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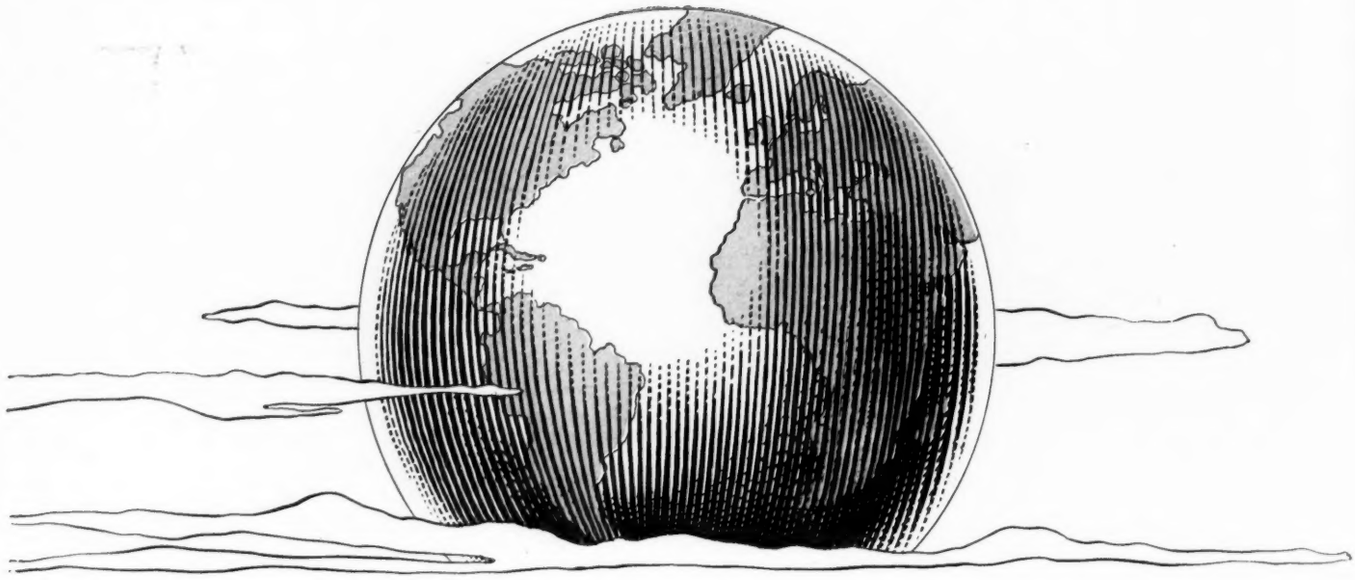

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLVII NEW YORK—THURSDAY, NOVEMBER 16, 1922 No. 20

Registrations Grow More Rapidly Than Population

New car sales will finally be in proportion to population growth. This period of stability still more than ten years away in all sections of country except Mountain States. Sales ability of dealer limited by rate of registration growth.

By Norman G. Shidle
Charts and Statistics by Raymond B. Prescott

AUTOMOBILE registration will continue to make marked upward strides every year for some time to come. Its progress is basically dependent upon the growth of population and, eventually, the registration curve will advance at about the same rate as the population curve. That period has not yet been reached, however, and will not be reached for a decade throughout the United States.

Everywhere, except in the Mountain States of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada, registrations will continue to climb more rapidly than population for about ten years or more.

These are the outstanding conclusions of a detailed statistical and economic survey of registration trends throughout the United States that has just been completed by AUTOMOTIVE INDUSTRIES. The survey bears out the general idea recently expressed by leaders in the industry, but adds to those general statements a wealth of accurate and detailed information upon the basis of which sales efforts can be directed.

Automobile sales are a function of population and for this reason their future growth can be predicted in a general way, over limited periods of time, by proper correla-

HERE is the first of a series of articles that every sales manager in the automotive industry will want to read and file.

Registration trends for nine chief geographical divisions of the United States are presented, their relation to population growth is shown, and their significance in planning future car sales indicated.

Later articles will have similar information for each of the States, beginning with some of those States most important from an immediate sales standpoint.

Proper interpretation of this material depends upon careful reading of the text and attention to the basis of the trends discussed. It should be noted that chiefly "rates of growth" in registration and population are discussed in this article. Actual sales figures are already available to most factories, but the significance of the rate of growth in various sections has not been clearly understood.

GEOGRAPHICAL DIVISIONS

(Considered in accompanying registration analysis)

NEW ENGLAND (Fig. 2)
Massachusetts
Rhode Island
Connecticut

MIDDLE ATLANTIC (Fig. 3)
New York
New Jersey
Pennsylvania

EAST NORTH CENTRAL (Fig. 4)
Ohio
Indiana
Illinois
Michigan
Wisconsin

WEST NORTH CENTRAL (Fig. 5)
Minnesota
Iowa
Missouri
North Dakota
South Dakota
Nebraska
Kansas

SOUTH ATLANTIC (Fig. 6)
Delaware
Maryland
District of Columbia
Virginia
West Virginia
North Carolina
South Carolina
Georgia
Florida

EAST SOUTH CENTRAL (Fig. 7)
Kentucky
Tennessee
Alabama
Mississippi

WEST SOUTH CENTRAL (Fig. 8)
Arkansas
Louisiana
Oklahoma
Texas

MOUNTAIN (Fig. 9)
Montana
Idaho
Wyoming
Colorado
New Mexico
Arizona
Utah
Nevada

PACIFIC (Fig. 10)
Washington
Oregon
California

tion of registration figures with growth of population figures. The economic, psychological and statistical basis of this method of sales analysis was thoroughly discussed in an article entitled "Statistics for Use in Making Sales Plans," published in AUTOMOTIVE INDUSTRIES of Nov. 17, 1921. It is available there for those interested in the method as well as the results, but is not repeated here because of its somewhat technical nature.

The general trend in registrations is shown in Fig. 1. Here are the actual and normal registration curves for the United States compared with the growth of population for the country. Registration figures are predicted for 1923 and 1924.

Automobiles, as other commodities have done, passed through a certain period during which they were a novelty in the life of the community. They gradually took their place as a part of the common life of the community and became a necessity rather than a luxury. As the industry finally comes into its period of stability, the growth in registrations will be in proportion to the growth of population, barring the introduction of some medium of transportation replacing the motor vehicle or the chance of extremely radical changes in the vehicle itself which would render it practically a different commodity.

Probable Progress Shown

The probable progress figures shown here, while not exact, contain a comparatively small factor of error, certainly less than 10 per cent and probably not more than 5. Consequently, they form a far better basis for long range sales planning than do guesses based on temporary economic conditions.

Flattening out of the registration curve for the United States, it appears, need not be feared for several years. Registration figures next January should show something like 11,600,000 motor vehicles in the United States.

These general figures are of interest to every sales manager in an inspirational rather than an immediately practical way. They point to the huge possibilities for business during the next few years, followed by a period of stabilization in which there will be a large replacement business supplemented by new business about in proportion to the rate of population increase.

But for immediate use, more detailed studies are needed.

Where shall we concentrate our sales activities during the next few years? Where will competition be keenest? Where is the best opportunity left to get in somewhere near the ground floor? Where will the most rapid sales development be in the near future?

Immediate questions of this sort are confronting sales departments. Proper allocation of sales effort depends upon the answers found. Success in carrying on the fight for dealers and wise handling of those dealers now in the organization are also involved. Data in this article and in those to follow will be useful in trying to answer those questions.

Trend in Nine Sections

Registration trends for nine important sections of the United States are shown in the accompanying charts. Future articles will discuss registrations and their relation to dealer and sales problems for each of the various States.

These charts must be considered from two points of view:

1. The relative growth of registrations as compared with population.
2. The actual growth of population as an index of sales after registration growth has become about analogous to population growth.

The second phase is of more academic than practical interest in most sections at the present time, since registration growth will be more rapid than population growth in all but one section for a number of years.

For the sake of brevity, we will refer to the time at which registrations reach the same rate of growth as population as the "period of stability."

The West South Central States (Arkansas, Louisiana, Oklahoma and Texas) are farthest from this period of stability than any other group. The West North Central States (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas) and the Pacific States (Washington, Oregon and California) also have a

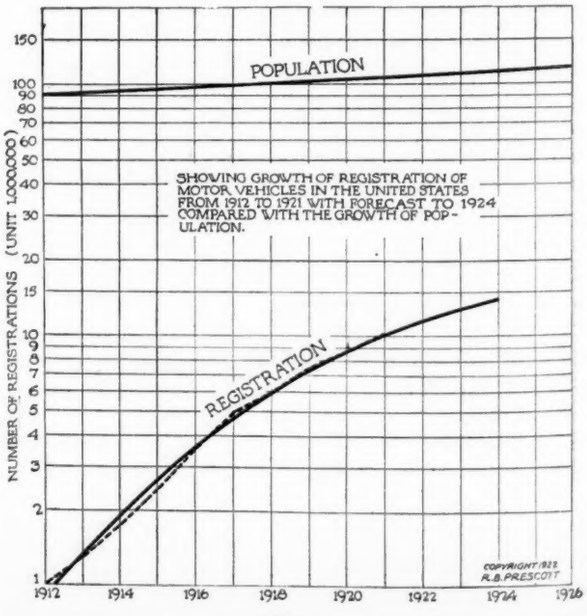


Fig. 1

good way to go. In the West South Central States, however, the rate of population growth is rapid, in addition to the registration curve having strong upward tendencies. The registration curve for this section shows no more signs of flattening out than it did several years ago.

Sales quotas in this section can be increased constantly for some years. There should be a good number of new buyers every year, entirely aside from those brought in by the normal population increase.

Investigations Needed

If sales records do not show such an increase in business, there is probably need for an investigation. Perhaps it will be found that some temporary economic condition is responsible for the drop, in which case nothing much can be done about it. There may not be enough dealers, however, properly to handle the territory, or the dealers already there may not be functioning efficiently.

It would be foolish, of course, to take the trends shown in these charts as absolute statements of the possibilities of a section over a given period, without considering as well various local changes and temporary conditions that may arise. The figures do give a good general picture of the situation, however, and will be reliable for general studies. They will frequently indicate a necessity for investigation which would not otherwise be recognized.

The situation indicated in the West South Central States pertains also in large measure to the West North Central and the Pacific Coast States, although the rate of growth of population in the second instance is markedly lower than in the first and third. This simply means that after the period of stability has been reached the annual growth in sales volume will be less in the West North Central section than in the two other sections just mentioned. (Figs. 5, 8 and 10.)

New England, the East South Central and the East North Central States, show a certain similarity, although

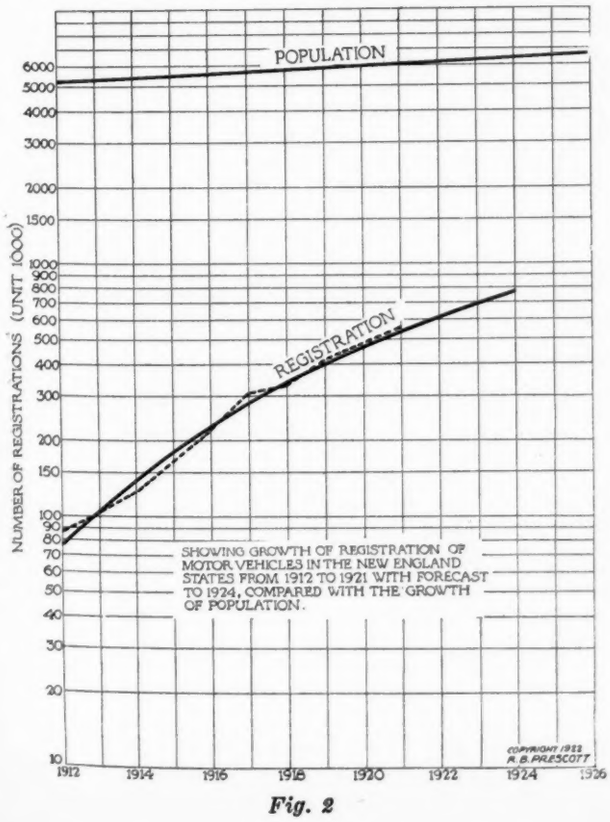


Fig. 2

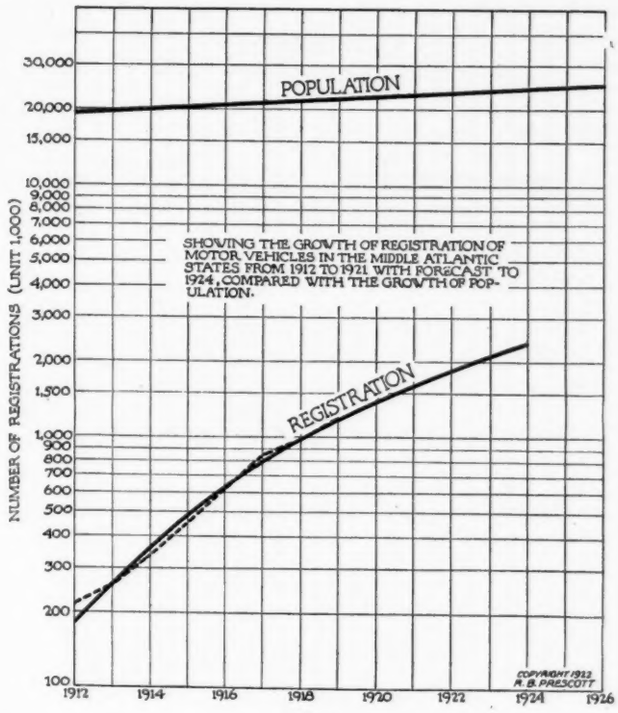


Fig. 3

it should be noted that for the purposes of this analysis only the States of Massachusetts, Rhode Island and Connecticut have been included in the New England chart. Maine, New Hampshire and Vermont show characteristics so greatly different from those of the three important States included that a curve combining all six would have been distinctly unrepresentative of any of them. (Figs. 2, 4 and 7.)

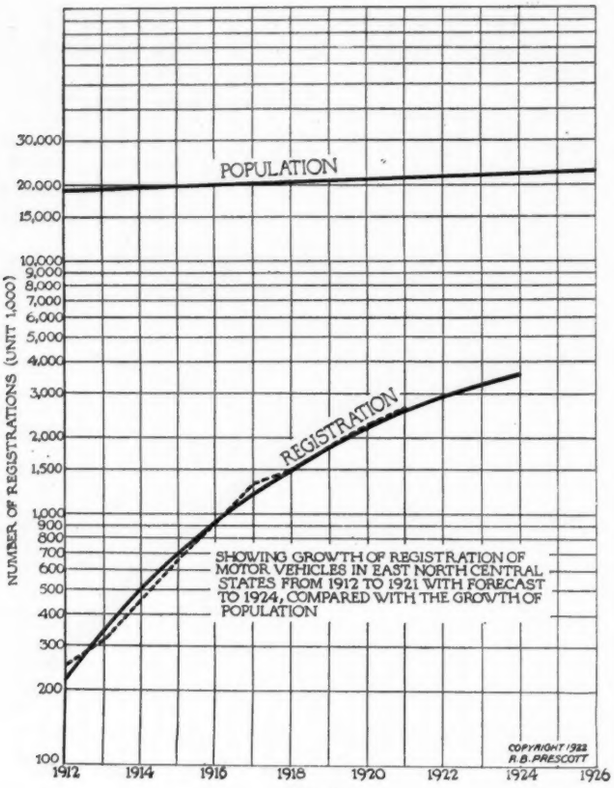
The New England States charted, the East South Central States (Kentucky, Tennessee, Alabama and Mississippi) and the East North Central States (Ohio, Indiana, Illinois, Michigan and Wisconsin) show a registration growth curve that is still moving more rapidly than their respective population curves. The rate of registration growth in each case, however, is already showing a distinct tendency to decrease as compared with its progress a few years ago. The reader will not confuse, of course, the term "rate of growth" with the actual growth of either registrations or population.

Sales Limited

In these three groups of States dealers cannot be expected to increase their sales at the same rate as in the past. They will continue to sell more cars every year for some time, but the rate of increase can be expected to decrease.

Competition is likely to be more keen in these sections than in the three western sections previously discussed. There is already a greater proportion of replacement buyers than in the first three cases discussed, and sales effort will be directed more toward people already familiar with some type of automobile. The number of new buyers coming into the market will be proportionately smaller and more intense merchandising effort will be necessary on the part of the individual dealer who is to make a success.

Sales will increase faster than population in these sections, however, for ten years or more. After that time the rate of increase in sales will be considerably smaller than in some of the western sections because the rate of growth of the population is less.


POPULATION
REGISTRATION
NUMBER OF REGISTRATIONS (UNIT 1,000)
SHOWING GROWTH OF REGISTRATION OF MOTOR VEHICLES IN EAST NORTH CENTRAL STATES FROM 1912 TO 1921 WITH FORECAST TO 1924, COMPARED WITH THE GROWTH OF POPULATION
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1912 1914 1916 1918 1920 1922 1924 1926

Fig. 4

Registrations are still growing rapidly in the South Atlantic States and in the Middle Atlantic States and bid fair to continue to do so for some time. In these cases, however, the continued rapid registration growth seems to be dependent upon the comparatively rapid population increase rate in these sections. The upward trend in population in both of these sections is rapid as compared with that in New England and the East South Central States. (Figs. 3 and 6.)

Stability in Atlantic States

The registration growth curve in the two sections of Atlantic States is rapidly reaching its period of stability.

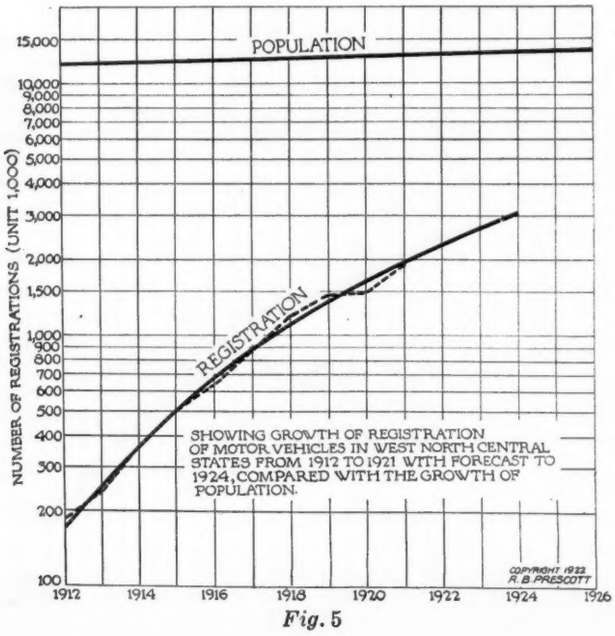
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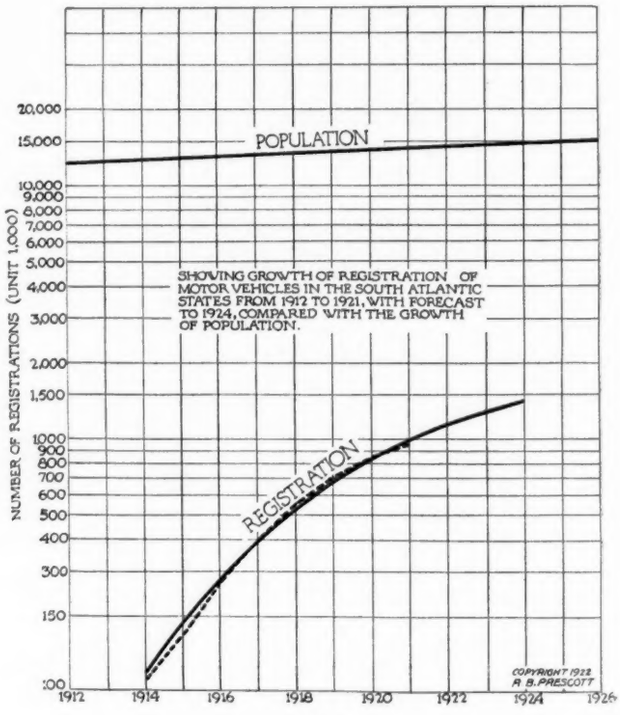
Fig. 5

It is already nearer to the population curve than in the New England and East South Central States, although population is growing faster in the Atlantic States.

The period of stability has almost been reached in the Mountain States (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada). Here the registration curve has distinctly flattened out until it practically coincides in general characteristics with the growth of population curve. (Fig. 9.)

Whatever increased sales are made in this section will be largely due to the national population increase, which will probably go forward at a good rate, as indicated on the chart. A larger proportion of sales will be replacement sales than in any of the other sections of the country.

If a dealer in the mountain States has had his quota increased 10 per cent every year in the past, it would not seem fair to expect him to continue to increase his sales at the same rate in the future. His territory in


POPULATION
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NUMBER OF REGISTRATIONS (UNIT 1,000)
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Fig. 6

general, at least, has reached the point where his sales from year to year should be more nearly stable and the yearly quota increase given him should be decreased in proportion.

These charts bring forcibly to mind the necessity for considering individual territorial characteristics in setting sales quotas. One factory, for instance, has been in the habit of setting a dealer's quota each year by giving him 10 per cent more cars than he had the year before. This policy has been in effect for the whole country for some years. Obviously, it is not sound practice, since it fails to take into consideration the special economics and population growth characteristics of the particular territory in which the individual dealer is located.

A flat percentage of increase over last year's sales, given to every dealer in the country will be fair to only a few, and to those few simply by chance. There are certain sales conditions that a dealer can control. He can properly be held responsible for having an attractive place of business, an effective method of finding and fol-

lowing up prospects, a capable and efficient sales staff and good business methods in general.

Other important factors, however, affect sales possibilities which the dealer cannot possibly control. The rate of population growth, current business conditions in a given territory, crop failures and other similar factors are in this group. If the factory is to set dealer quotas intelligently, play fair with the dealer, and properly correlate its own production and sales, all such factors should be considered in setting the quota.

How to Use the Curves

The charts given here, as a matter of fact, are useful only in a general way in allocating sales. The curve for a given group of States may not hold entirely true for a given State or a given territory within a State, although further articles will show that the sectional curve is about the same as the individual State curves in most cases. The curves are useful, moreover, for localizing trouble. If the sales in a given section seem out of line with the general curve, an investigation is probably needed. That investigation will split the territory up into its integral parts and thus finally uncover the real trouble. The charts given here are extremely useful, but should by no means be regarded as thinking or magic organisms. They do constitute an excellent basis upon which to begin study and investigation.

The fight for dealers which is now going on must finally take into account the possible prosperity of the individual dealer. A manufacturer cannot simply assume that he will profit by having as many dealers as possible. He benefits in the long run by having the greatest number of stable, prosperous dealers.

Questions such as these will have to be answered:

How many cars per dealer should there be in a territory? How many service stations are necessary to service a given number of cars? Should the number of dealers increase in direct proportion to the number of cars in a territory? Or will one dealer be able to sell more cars as car population becomes more dense?

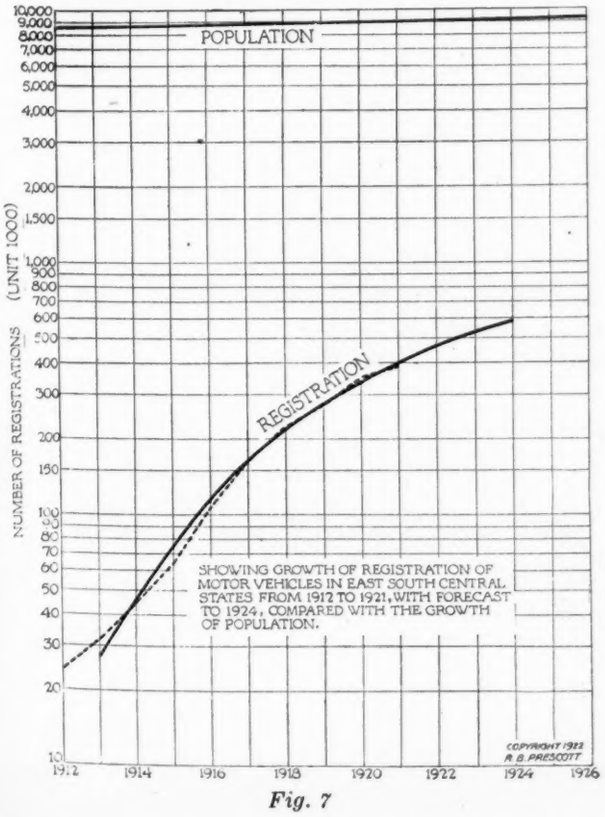

Fig. 7

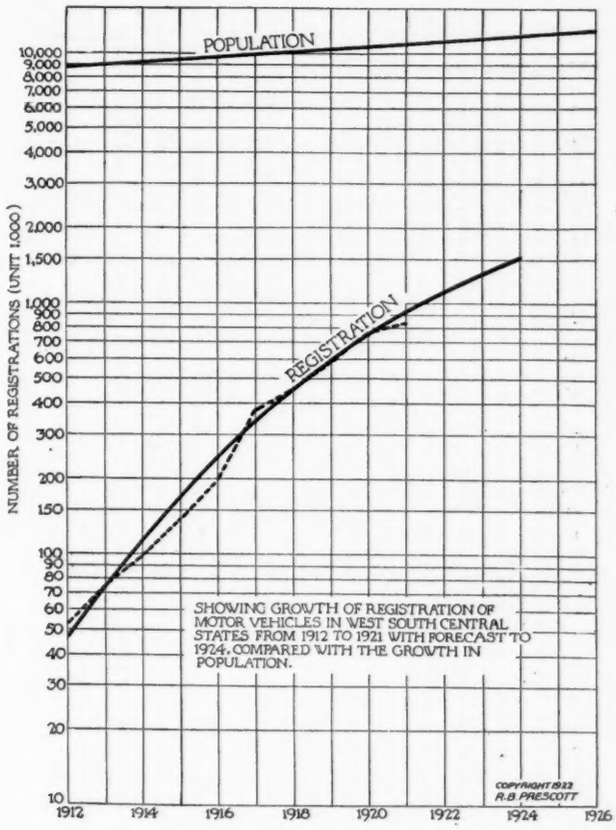

Fig. 8

Practically no studies have been made along this line. The questions cannot be answered offhand in a brief article nor accurately on the basis of information now available. The chart shown in Fig. 11, however, gives an interesting record of what has happened in the past, taking the country as a whole.

Dealers Increase in Numbers

The total number of retail establishments selling automotive products has not grown quite so rapidly as the total car registration. The figures include dealers, garages, and repair shops, a single retailer fulfilling all three functions in many cases. The curve showing number of dealers by years and the curve showing number of garages by years, exhibit approximately the same characteristics as the total retailers curve. Dealers have not increased quite so rapidly as have car registrations.

Looking only at the figures in the curves, it might be predicted that as car population becomes more dense, a single dealer will be able to visit and sell more replacement owners and new buyers; that, for this reason, there will continue to be more cars per dealer.

This statement is true for the time being, simply because increased density of population has thus far made it easier and easier for a single dealer to reach a larger number of prospects. During this time, the automobile has been going through its period of adjustment into the normal economic fabric. Car registrations have therefore grown more rapidly, as already pointed out, than population. Keenness of competition has been offset by the fact that there has been plenty of business for everyone, speaking in a general sense. If this condition were likely to continue the story of the figures alone would be true.

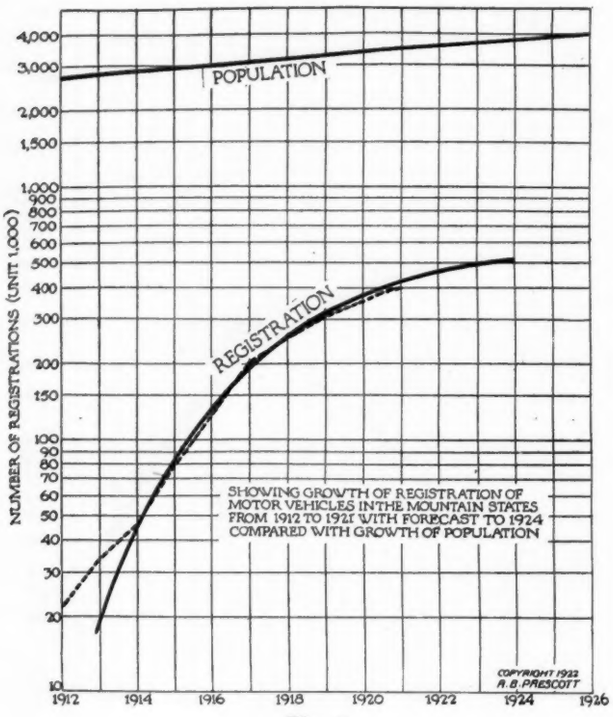
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Fig. 9

But conditions are changing, as is shown by the sectional charts already discussed. A few years hence a large part of total sales will consist of replacement sales. While a dealer will physically be in a position to reach more prospective buyers than in the past, competition will be much more keen. More time and effort will be necessary to make a sale.

More Intensive Marketing

Considering these factors, it appears likely that the pendulum will swing back in the other direction. Fewer cars per dealer will result. More dealers will be required to sell a given number of cars. The dealer curve in Fig. 11, if projected forward for ten years, would probably show a rate of growth more rapid than that of car registrations.

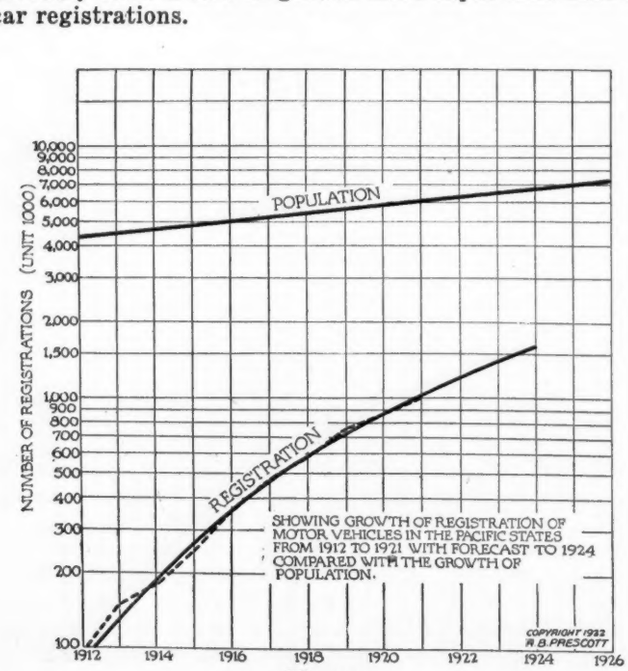
POPULATION
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Fig. 10

Such a development means that there must finally be a rather nice adjustment between the extent and character of a dealer's territory and his ability to stay in business. The manufacturer needs more dealers to produce the maximum sales possibilities. The dealer must be allowed enough possible sales in his territory to make it profitable for him to stay in business.

The dictates of economic law will settle the adjustment, of course, eventually. Whatever studies make it possible to effect an adjustment before this harsh judge steps in, however, will be distinctly to the financial advantage of the manufacturer.

Repair shops have increased more rapidly than car registrations during the last two years. This trend is in line with the increased necessity for proper service and the realization of that need on the part of manufacturers. There is no means of telling what the future trend of the repair shop curve will be, because we cannot determine to what extent maximum service demands have been met by those shops now in existence.

It will be interesting to note the distribution of these shops by States, however, in the future articles which will discuss registration trends in greater detail.

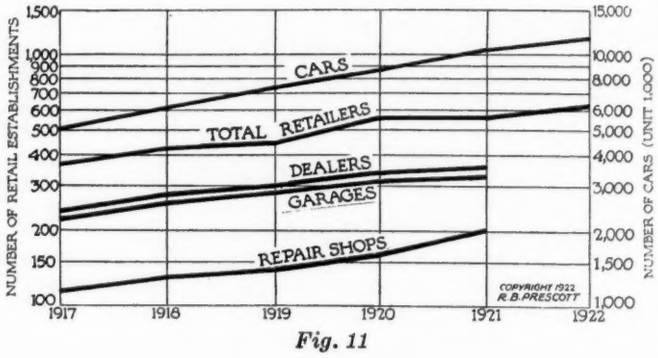


Fig. 11

Three-Joint Propeller Shafts

AT the time the present Society of Automotive Engineers Recommended Practice for three-joint propeller-shafts was voted upon by the Society members, one or two criticisms were submitted in reference to the use of the square type of shaft end. This matter was reviewed at a recent meeting of the Truck Division of the S.A.E. Standards Committee and, as it was felt that it is preferable to use either the taper or spline type of shaft end, the Division recommended that the present square type be omitted. It was thought that in case a square type of shaft end is desired for use at this point, the present S.A.E. Standard square shaft fitting should be used as a basis for the shaft end design.

THE container system of burglar-proof mail transportation in operation between New York and Chicago has been extended to St. Paul and Minneapolis. The railroad container car carried nine large steel boxes equipped for loading and unloading by crane to and from motor trucks.

Tank containers for the transportation in bulk of milk or other fluids is the latest extension of the system, which has proved so successful in the handling of freight through efficient co-ordination with motor trucks.

Each of the nine milk containers carries 600 gallons or the equivalent of sixty of the standard 10-gallon cans. Two hours of manual labor of loading and unloading of cans are saved, as well as avoiding detention of the railroad cars in the yards and terminals.

Mason Road King, New Durant Product

Speed truck type, carrying 35-40 h.p. Hercules engine with 1¼ in. carbureter. Full electrical equipment. Final drive is by spiral bevel gears. Pressed steel frame. Chassis with cab weighs 3320 lbs. Full-floating type axle. Half-elliptic springs used throughout.

A 1-TON speed truck has been developed by the Mason Motor Truck Co., a subsidiary of Durant Motors, Inc., and will be marketed under the trade name, Mason Road King. It has been designed to meet the general requirements of the speed truck field; that is, to furnish rapid transportation at moderate cost for operation and maintenance.

The engine is a Hercules four-cylinder type of 4-in. bore and 5-in. stroke and is rated at 35-40 hp. It is fitted with a 1¼-in. carbureter, which is supplied with fuel from a 12-gal. dash tank by gravity feed. The cylinders are block-cast, with a detachable head and an aluminum oil sump. Full electric equipment is provided, including lighting, starting and ignition, the whole system being of Auto-Lite make. A U. S. L. storage battery of 117 ampere-hours capacity (rating based on 5-ampere discharge rate) is included in the equipment. Lubrication of the engine is by pressure to the main bearings and by splash to interior parts, and an oil pressure gage is fitted to the dashboard. The cooling water is positively circulated by means of a pump, the latter being provided with a "through" shaft for the generator drive. The flat tube, cellular type radiator is of large capacity and back of it is fitted an 18-in. fan driven by a 1½-in. flat belt from the forward end of the accessory shaft. The fan spindle is mounted in a vertical slot of the fan bracket and the belt tension can be readily adjusted by means of a screw with lock nut located on the top of the bracket in a very accessible position.

A plate clutch with external adjustment and a light driven member is used. The gearset is a three-speed type of Warner manufacture and is separately mounted on the sub-frame. Between it and the clutch there is a Spicer double-universal joint to take care of any misalignment between the engine and gearset bearings. The reduction ratios of this transmission are as follows: First forward, 3.53; second, 1.74; third, direct drive; reverse, 3.97. The control lever for the gearset is mounted on the cover plate and the truck is therefore arranged for center control.

The rear system is of the torque arm type, comprising an exposed tubular propeller shaft with two Spicer universal joints. Final drive is by spiral bevel gears with a reduction ratio of 4.9 to 1, though a specially low reduction gear of 5.5 to 1 will be furnished for hilly countries if desired. The rear axle is of the full floating type of built-up construction. The truck has a wheelbase of 130 in. and the standard 56-in. tread.

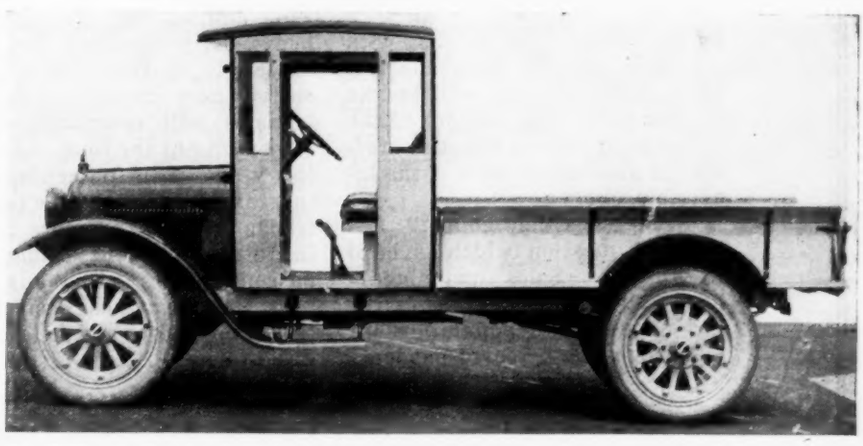
The frame is of pressed steel, the two side members extending parallel of each other and having a 5 9/16 x 1¾ x 3/16 in. section. Suspension is by half-elliptic springs all around, the front springs being 38 in. long and 2 in. wide and the rear springs 40 in. long and 2½ in. wide. Driving thrust is taken up on the rear springs. The wheels are of the wood type, fitted with demountable rims and 34 by 5 in. pneumatic tires all around. Both sets of brakes act on drums on the rear wheels, which drums are 14 in. in diameter and have a width of braking surface of 2¾ in. The outside or contracting brakes are the service brakes. The front axle is of the usual I-beam section, 2⅝ by 1¾ in. The steering gear is mounted on the left side of the chassis and carries an 18-in. hand wheel.

A number of body types will be standardized, including a stake body and an open express body. The truck chassis with cab but without body, weighs 3320 lb. The complete truck with stake body weighs 3950 lb. and with box body 3690 lb. The cab furnished has sliding curtain doors with celluloid windows that can be quickly lowered or raised. Equipment furnished with the truck includes a pump, jack, set of tools, head, dash and tail lamps, ammeter, Stewart speedometer and ventilating windshield. Lubrication of the chassis bearings is partly by grease and partly by oil.

The chassis lists at $1200 and with cab at $1325.

AN opening exists in the Ceylon market for American-made automobile-top canvas, according to Consul Marshall M. Vance, Colombo, Ceylon. Ceylon top-makers require a canvas guaranteed absolutely water-proof. The local requirements are for a canvas of 72-in. width, the ordinary 56-in. width being insufficient.

The colors most in vogue in Ceylon are khaki or various shades of green. Wholesale prices of importations from other countries are from 4s. 6d. to 8s. per yard, dependent upon quality.



Mason one-ton "Road King," a new Durant product

Just Among Ourselves—

Lifting Veil of Secrecy from Output Figures

THERE appears to be a gratifying tendency toward less secretiveness in regard to production figures. The recent publication by General Motors Corp. of its output by divisions for the past four years was an interesting sign of the times. No logical reason is apparent for the reluctance of big production companies to let the public know what they are doing. Nearly all of them are getting their fair share of business and they may well be proud of their records. It is possible to understand why some of the smaller companies, whose output is not as large as they would like the public to think, might prefer secrecy but their aggregate sales make up a comparatively small percentage of the total.

The totals for each month are now available through the N. A. C. C. reports to the Department of Commerce and N. A. C. C. members get the totals by companies each quarter. The industry generally is mightily interested in what individual companies are doing and those which are having a good business might well show their pride by telling the world about it.

"Where Are Cars Going?" Is Popular Query

ANOTHER astounding production record was established by the industry in October with a total of 244,000. It means that 1922 unquestionably will be the biggest year in the history of the industry in volume if not in profits. It also brings with it the inevitable query:

"Where are they going?"

It's a question which is hard to answer. Sales undoubtedly have fallen off somewhat in the larger centers of population but a survey made by correspondents of AUTOMOTIVE INDUSTRIES shows that few cars are going into storage. There must have been, therefore, a big increase in sales in the smaller towns and in the rural districts.

The farmer has been a bit slow in coming back into the market but he certainly is coming. He will do a lot of buying the rest of this year and he will do much more in the spring. He is grumbling at the prices he is getting for his crops but that is nothing new. He needs cars, trucks and tractors and he's going to have them. He also wants farm lighting equipment and he's beginning to buy it.

We have said time and again that the farmer isn't broke. He's much better off than a great many people think he is. He had gotten out of the buying habit for a long time but he'll acquire it again. The South is vindicating the prediction we made in August that it would be a good market for automotive products. It is one of the brightest spots on the sales map. The farmers down there have $1,000,000,000 more to spend than they had a year ago.

Truck Makers Coming Into Their Own

THE truck market is steadily expanding as the year advances and as the traffic jam on the railroads becomes more acute. This applies both to light and heavy duty vehicles but more especially to the former. Indications now are that commercial vehicles will constitute around 12 per cent of the total output for the year. This percentage will increase in 1923. The sale of trucks will expand more rapidly in future than the demand for passenger cars. The bus business this year has been larger than ever before and it is just in its infancy. Sales of rail cars have reached respectable proportions, also.

Truck makers have had a long, hard, discouraging pull, but they are about to reap the reward of their patience. Growth of this branch of the industry in the next ten years will be comparable to that of the passenger car in the past decade. We hope in the near future to tell some of the reasons why this cannot fail to be true.

"Secondary Inflation" Must Be Watched

ALFRED REEVES, general manager of the National Automobile Chamber of Commerce, whose advice to the members of the organization he represents generally is mighty sound, has warned them that the country is entering a secondary period of inflation. He bases his conclusions upon sound premises. Inflation and deflation follow in rather regular sequence. The only difference is that some of the ups and downs are greater than the others.

Freight car loadings indicate that the present volume of general business probably is greater than ever before and it is inevitable that there will be a reaction sooner or later. The lesson of 1920 has not been learned well if this fact is not understood.

The disturbance will not approach in its severity that from which the country has now emerged, but it will bring elements of danger to the unwary or the reckless. There will be splendid business for a long time to come for those who proceed cautiously and sanely, but those who don't may find themselves in trouble.

Reeves attributes the remarkable sales of motor cars this year to the "dammed up" demand resulting from the war period and the depression. He is right. The

What Men in the Industry Are Thinking as Recorded in the Editor's Note Book

same condition prevails in almost all other lines. When this demand is satisfied there is likely to be something of a slowing up in industry generally unless there is a sharp increase in export trade. This will depend chiefly upon the recovery of Europe.

There is enough business in the United States alone to insure a reasonable amount of prosperity, however, no matter what conditions may be in the rest of the world.

A Little Speculation About Prices

PROFITS are looming large on the automotive horizon, not because of their size but because of their importance. There is much speculation as to whether vehicle prices will go lower. If they do it will be surprising. Parts makers are strongly inclined to feel that about all the car and truck manufacturers have passed on to the public in the way of price reductions has been what they have saved in the cost of parts and materials.

This view is supported by the statement to us the other day by the executive head of one of the largest producers in the business, that he believed profits generally were as large as they were at the beginning of 1920. He admitted the public had merely been given the benefit of savings on materials plus a few manufacturing economies.

It would not be surprising if the parts manufacturers were to take the bull by the horns in the near future and boost their selling costs a bit. They are doing plenty of business but they don't feel they are making as much as they should in proportion to the volume. The materials they use are costing them more all the time, they assert, and some of them are about ready to take a firm stand. They contend that if they do there will be no excuse for adding the difference to the retail selling prices.

"Let the vehicle makers be content with a little smaller profit for a while, just as we have been," they say.

Farm Machinery and Prices

SPEAKING of prices, the farm equipment manufacturers contend they can't reduce theirs because of the higher costs of materials. They have made some slight concessions since the depression began in 1920, but not many. Their business hasn't come back in anything like the proportion it has in the car and truck fields. They assert that the farmer can't buy because he isn't getting enough for his crops. As a matter of fact, the farmer is getting pretty fair prices. He is buying the things he needs on which he feels reasonable price cuts have been made. Motor vehicles come in this category. If the farm machinery makers were to take smaller profits and modernize their selling methods they might find the volume of sales much larger.

Can Shortage of Closed Cars Be Avoided?

THERE is an actual shortage at this time of closed cars. Dealers are howling for them and they are losing sales because they can't fill orders on their books. This is especially true with those handling the more popular lines. Many factories have increased their closed car schedules until they are 30 per cent or more of the totals. They probably would boost them higher if they could get enough bodies.

While nearly every one conceded at the beginning of the year that there was going to be an unprecedented demand for closed cars, almost all manufacturers underestimated the volume of sales. A serious body shortage has handicapped them all the year. As a consequence, at a time when there is an insistent call for closed cars, few dealers have anything to sell except open models. Naturally, open cars are not as popular in the fall as they are in the spring. When there are not enough of the closed type to meet the demand both factories and dealers lose money.

It would be a happy arrangement if some system could be worked out whereby a reserve of closed cars could be built up when open models are selling best and vice versa. It would tend to stabilize the business. Perhaps it can be done when the body building capacity of the country can keep pace with current needs.

New Type of Discount Proposed by Dealer

A PROMINENT New York distributor made an interesting suggestion the other day which might be of interest to manufacturers. It was based partly upon his complaint that he was losing money because he couldn't begin to fill all the orders on his books for closed cars. He contended that if manufacturers would give a longer discount on open models in the fall and winter it would help them to keep their factories going full blast at a time when sales are slack. Dealers would have a chance to stock cars on this special discount basis and they could make more money selling them in the spring when demand is strongest. Their earnings for the year would thus be equalized.

From the point of view of the dealer, at least, it doesn't look like a bad idea if he has sufficient capital or credit to buy the cars and carry them in stock until he can get rid of them. J. D.

Five Bearing Crankshaft Important Feature of New Lycoming Engine

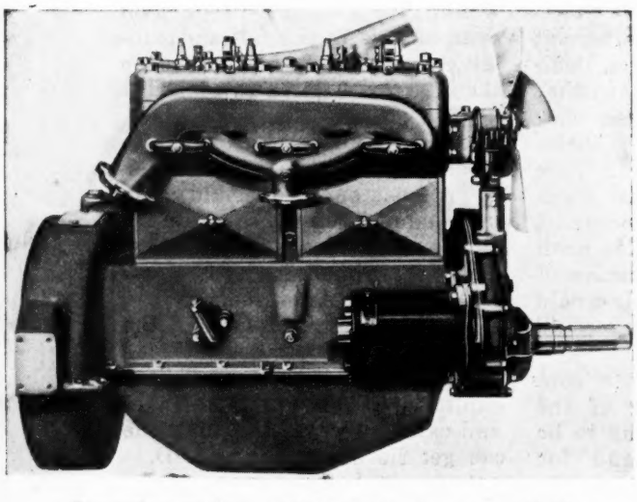
Smooth operation obtained by use of long connecting rods and light reciprocating parts. Special type force feed lubrication used. Bore 3½, 3⅝, or 3¾ in. and stroke 5 in. Lynite or cast iron pistons optional. Performance good in power and flexibility.

By Donald D. Blanchard

UNUSUALLY smooth operation at all speeds has been secured in the new Lycoming four-cylinder engine through the use of long connecting rods and light reciprocating parts. In addition to freedom from vibration, the performance of the new engine is highly satisfactory from the standpoints of power and flexibility. For test purposes the engine was installed in a five-passenger phaeton weighing about 2700 lbs. and with a rear axle gear reduction of 4.8 to 1. It is claimed that a speed of 65 m.p.h. has been attained with this car and that it will accelerate from 5 to 25 m.p.h. in 8 seconds. A stiff five-bearing crankshaft and a system of force feed lubrication, in which the pressure is controlled by the throttle, are important constructional features of the new engine which will undoubtedly contribute much to its durability.

The new engine will be known as the Model C Series and is offered with 3½, 3⅝ or 3¾-in. bore and 5-in. stroke. It may be had with either Lynite or cast iron pistons.

The cylinder block, the upper half of the crankcase and the detachable cylinder head are all gray iron castings. The water jackets are integral with the block. Water passages are provided around all valve ports, spark plug bosses and over the combustion chambers. The block is attached to the crankcase by eleven 7/16-in. studs. The cylinders are rough bored, tested under 100 lbs. water pressure, finish bored and ground to size. The crankcase is stiffened by the webs which carry the main bearings. The flywheel housing is an integral part of this casting. The cylinder head is fastened to the block by eighteen ½-in. studs.



Lycoming engine. Intake and exhaust manifolds integral

The crankshaft is drop forged of .40-.50 carbon steel and is heat treated. The flywheel is attached by means of six ½-in. bolts to a 6-in. flange forged integral with the crankshaft. All bearing surfaces are ground and the crankshaft is drilled for force feed lubrication to main and connecting rod lower bearings. The finished shaft is tested for dynamic balance.

The crankshaft is carried in five main bearings. These bearings are 2⅛ in. in diameter. The front and rear main bearings are 2⅝ in. long, the center bearing is 1 13/16 in. long and the two intermediate bearings are 1 5/16 in. long. The connecting rod bearings are 2⅛ in. in diameter by 1 13/16 in. long.

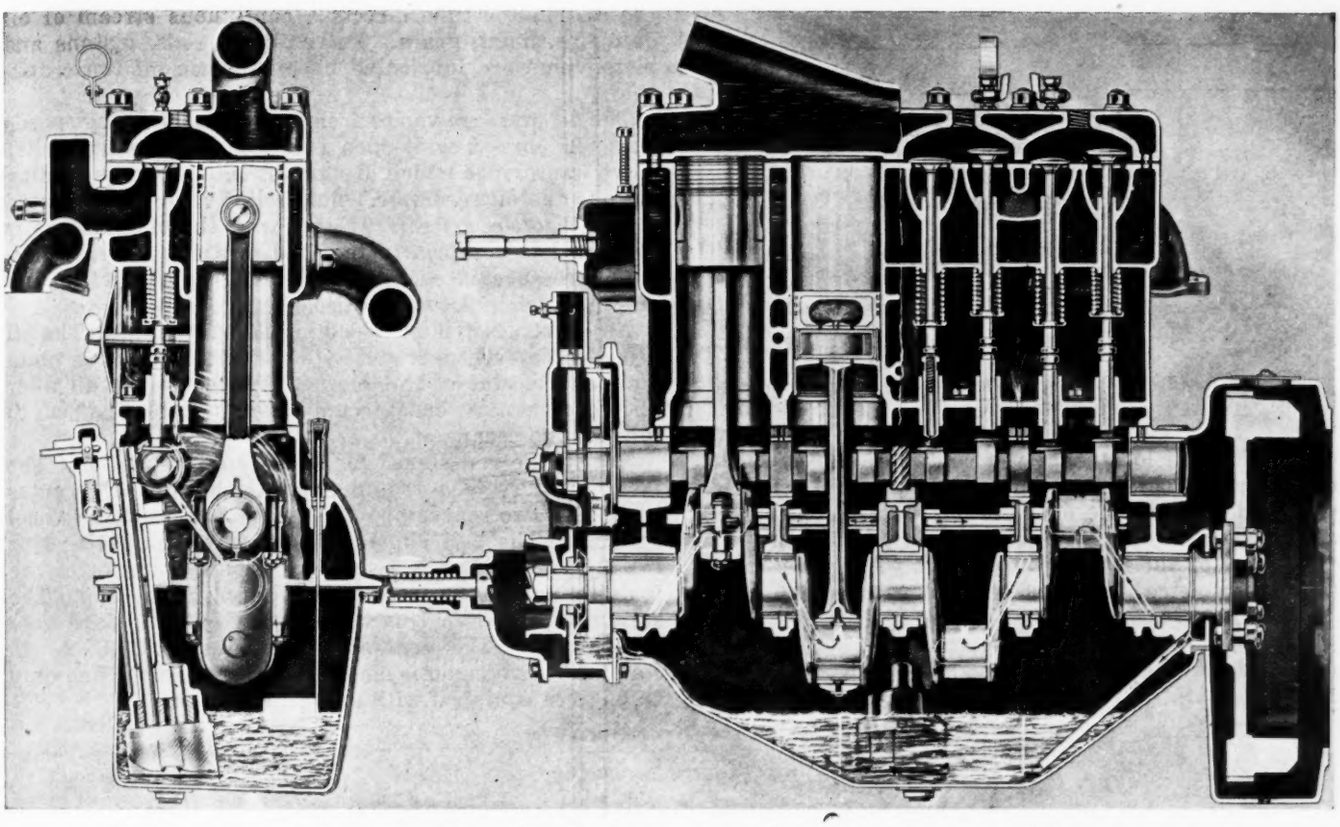
Piston Equipment Optional

Either Lynite, an aluminum alloy, or cast-iron pistons may be had with this engine. Both types are fitted with .003-.004 in. clearance at the first land. The Lynite pistons are of the split-skirt type. Three piston rings are used, all located above the piston pin. Two of the rings are ⅛ in. wide and the third is 3/16 in. The piston length is 4⅛ in. The piston pins are 1⅛ in. in diameter and 2 29/32 in. long. They are made of case-hardened steel, drilled hollow and ground.

Full floating piston pins are used in the Lynite pistons, endwise movement being prevented by snap rings in the piston pin bosses. The connecting rod is bronze bushed. When cast-iron pistons are used, the piston pin is clamped in the connecting rod, the bearing being in the bosses.

The connecting rods are of I-beam section, drop forged of .40-.50 carbon steel and heat treated. The length from the center of the piston pin bearing to the center of the crank pin bearing is 12 in. Bronze backed, babbitt-lined bearings, ground to size, are used in the big ends. The cap is held in place by two 7/16-in. nickel steel, heat-treated bolts. The main bearings are also bronze backed, babbitt lined. No shims are used to fit the bearings. They are fly cut and line reamed to a clearance of .0015 in. to allow for the oil film.

The valves are interchangeable and have cast-iron heads electrically welded to steel stems. The valve lift



Sectional views of new Lycoming engine showing pressure lubrication system, water jacketing, and manifold construction

is 11/32 in. and the effective working diameter is 1⅝ in. The tappets are of low carbon steel, case hardened, ground and fitted with hardened steel adjusting screws and lock nuts.

The camshaft is a .15-.25 carbon-steel drop forging and is case hardened and ground. The cams are tested for a scleroscope hardness of from 75 to 90. The camshaft is carried in four removable bronze bushings. The camshaft diameter is 1⅛ in. and the bushing diameters and lengths are respectively: Front bearing 2 1/32 x 2⅛ in., second bearing 2 x ⅞ in., third bearing 1 3/32 x ⅞ in., and rear bearing 1 15/16 x 2 in. A spring-operated plunger bearing on a hardened steel button on the front end of the camshaft takes the end thrust and automatically adjusts for wear in the timing gears, which are helically cut. The crankshaft and generator gears are fiber and the camshaft gear is cast iron. Removal of the timing gear cover renders these gears easily accessible.

Semi-Steel Flywheel

The flywheel is of semi-steel. It is machined all over and tested for dynamic balance. Teeth for the starting motor are cut in the periphery of the flywheel.

The intake and exhaust manifolds are an integral casting which is held in position by clamps. Proper alignment between the intake manifold and the intake ports is secured by means of steel sleeves fitted into the intake ports. A hot spot is provided to assist in the vaporization of the fuel. The 1-in. S. A. E. carbureter flange is for a carbureter top outlet.

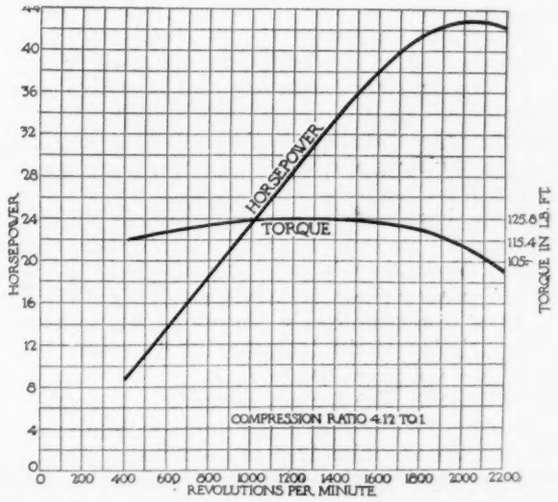
Cooling is by thermo-syphon. The fan drive pulley is mounted on the front end of the crankshaft, and there is ample clearance for removing and replacing the fan belt. The belt is a 1¼-in. flat type. The fan is carried on an adjustable supporting bracket which is fastened to a pad on the front end of the cylinder block. The fanshaft is ¾ in. in diameter and is threaded into the fan bracket for easy adjustment.

Provision is made for mounting the ignition unit at the front end of the gear case over the timing gears. It is driven off the camshaft gear by a spiral gear. The mounting is adapted to take any standard make of distributor. The rotation of the distributor is clockwise when looking down on it from above the engine.

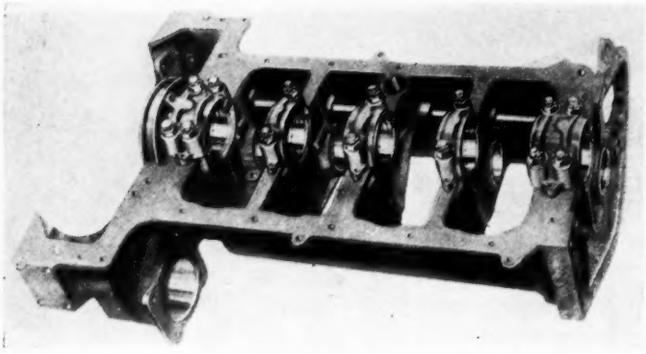
The lower half of the crankcase is pressed steel. A cork gasket is provided between oil pan and case to prevent oil leakage.

Pressure lubrication is used. Oil is carried under pressure to all main, connecting rod big end and camshaft bearings. The entire circulating system is contained in the upper half of the crankcase.

The gear type of oil pump is driven at camshaft speed



Performance curve of Lycoming engine



Five main crankshaft bearings of new Lycoming engine

by spiral gears located at the center of the camshaft. It is supported by the upper half of the crankcase but extends down into the oil reservoir. This construction permits removal of the oil pan without interference with other parts of the lubrication system. The pump intake is always immersed in oil and requires no priming.

The pump discharges directly into a distributor tube cast into the upper half of the crankcase. This tube is connected by holes drilled through the webs to all camshaft and main bearings. A nozzle on the front end of the distributor tube directs a continuous stream of oil onto the timing gears. Valves, push rods, pistons and piston pins are lubricated by oil thrown off the crankshaft.

The oil pressure varies from 2 to 5 lbs. at idling speeds up to 25 lbs. at wide-open throttle. A pressure relief valve is provided which discharges into a bypass leading back to the oil reservoir. This relief valve is connected to the throttle control. In this way, the oil pressure is regulated to conform to the load on the engine. Maximum pressure is secured with wide-open throttle and minimum with closed throttle.

An oil strainer is provided at the pump inlet. The oil level indicator is operated by a cork float and is in plain view on the side of the engine. The combined oil filler and breather is constructed with suitable baffles to prevent the escape of oil.

The engine is designed for three-point suspension. The front support is a trunnion on the crankshaft center line. The two rear support pads are cast on the flywheel housing. The bell housing flange is either a No. 3 or No. 5 S. A. E. standard size. Provision is made for the installation of a two-unit starting-lighting system. The starting motor flange is a No. 1 S. A. E. standard type outboard and the generator flange a No. 2 S. A. E. standard. Provision is made for governor mounting only on engines equipped with magneto ignition.

A Device to Facilitate Starting

A DEVICE intended to minimize gear shifting and to facilitate starting is being marketed under the name "Flexo-Drive." It makes starting in high gear feasible under most conditions without the noise which is more or less characteristic of the starting period in average cars. When once in gear the car fitted with this device can be repeatedly started and stopped without employing the clutch, so that the control is confined for the most part to use of the throttle and brake.

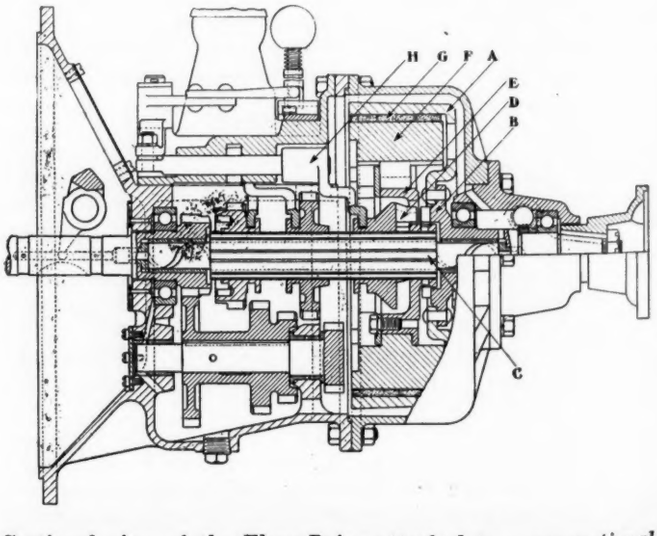
The Flexo-Drive does not replace the gearset, but is designed to attach to it. Certain control parts of the gearset must be altered and the main shaft extended, as will be seen by reference to the accompanying cut. It will be noted that the arrangement of gearing is conventional so far as gearset itself is concerned, but that the case of the gearset is provided with an additional housing in which the Flexo-Drive mechanism is located.

The drum *A* is riveted to the flange *B*, the hub of which is bushed to receive a pilot on the rear end of the splined main shaft *C* of the gearset. The weight spider *E* is splined on shaft *C* and consequently is positively driven by it. In low or second gear the jaw clutch *D* locks the flange *B* to shaft *C*. This is accomplished by moving control rod *H*. The operation is then precisely the same in effect as in the first and second gears of a conventional gearset.

Ordinarily, however, the gearshift lever is placed in the high speed position, even when starting the car, except on a considerable grade or in very heavy going. In the high speed position the spider *E* carrying weights *F* faced with brake lining *G* transmits the torque to the weights and thence, by friction of the facings with the drum *A*, to the drum and its carrying flange *B*, to which the propeller shaft is attached. The facings *G* are held in contact with the drum only by the centrifugal force acting upon them and the weights to which they are attached. There is, of course, some slipping when a start is made from rest. As the throttle is opened the engine speeds up and the pressure on the facings immediately increases in proportion to the square of the speed, until it reaches a point sufficient to carry the load without slip. When this point is reached, as it can be very quickly by proper use of the accelerator pedal, the propeller shaft rotates at the same speed as does the crankshaft of the engine and the gearset shaft *C*, so that operation is then the same in effect as it is in high gear with a conventional arrangement.

Competent observers who have ridden in a car fitted with the Flexo-Drive state that it accomplishes exceptionally smooth and easy starting and that, when once engaged, neither the clutch nor the gearshift lever have to be used as long as the torque required to propel the vehicle does not exceed that of the engine on direct drive.

The device is manufactured by the Flexo-Drive Corp.



Sectional view of the Flexo-Drive attached to a conventional gearset

Suggested Terminology for Various Types of Radiator Cores

Three names proposed are the fin and tube, the ribbon cellular and the air-tube cellular. Much confusion now caused by lack of standard nomenclature. Radiator Division of S. A. E. Standards Committee is expected to give the matter early consideration.

By Herbert Chase

IN compiling statistics covering various types of automotive vehicles there has been found to be a marked lack of uniformity in the names used to designate certain parts. There is a chance for confusion when different names are used for the same part, but when the same name is used to describe types of parts which are materially different in principle of construction or operation confusion is almost certain to occur. This is precisely the case in respect to radiator cores. The terms honeycomb, cellular, hexagon-tubular, genuine honeycomb, true cellular, etc., are used more or less interchangeably for quite different types of construction with important differences in operation. Even radiator manufacturers do not agree among themselves, hence it is not surprising that persons who are unfamiliar with the different types of construction are easily confused or quite unaware that a distinction should be made.

After corresponding with several radiator manufacturers and giving the subject considerable study the accompanying definitions are suggested as being logical and tending to minimize if not eliminate confusion. There are numerous subdivisions which can be made under each of the three heads, but we believe that all radiators now extensively used for automotive purposes fall under one of the three. A few practically obsolete types and a few aircraft radiators of special design may not be covered by the definitions.

Suggested Definitions of Core Types

Fin and Tube Type

The fin and tube type radiator core is one made up from continuous water tubes over which fins are fitted. The tubes have various shapes of transverse section but are not crimped and are not of that wide flat type which is formed by joining two metal ribbons at each edge.

Ribbon Cellular Type

The ribbon cellular type of radiator core is one made up from continuous water tubes formed by joining two metal ribbons at each edge. The walls of the tubes are usually crimped and are so grouped as to form a cellular structure. In some cases a part of the cellular structure is formed by flat or crimped ribbon, which is not a part of the water tube walls.

Air Tube Cellular Type

The air tube cellular type of radiator core is one made up from air tubes which are nested in such a way as to form water passages between the tubes, these passages being sealed by soldering at the ends of the tubes. In this type of core the general direction of water flow is at right angles to the tubes, but the water can flow transversely as well as vertically through the passages between tubes.

Under the first definition given in the accompanying table will be included all radiators containing continuous water tubes except those which are crimped or formed from ribbon. These need not be placed in a vertical position and need not be straight as some proposed definitions suggest. The radiator used on the larger Mack trucks, for example, is a fin and tube type, but the tubes are bent to form an arc of a circle for convenient positioning in relation to the blower used in that instance.

Although the fin and tube type of core is made up in some cases with a front giving it a cellular appearance, so that the uninitiated may be led to refer to it as a cellular or honeycomb type, there is probably less confusion in respect to this type than is the case with either of the others.

A few examples of the plain tube or unfinned type are still used, but they are seldom seen to-day; hence a separate definition is not thought necessary.

The fin and tube type is partly direct radiating surface—with water on one side of the tube and air on the other—and partly indirect, the fins having no direct contact with the water.

The ribbon-cellular type of core is made up in a great variety of designs, but is always formed from ribbon which is crimped into various shapes. The tubes between headers are continuous, so that there is no transverse flow such as is possible in the third type defined.

In several makes of ribbon-cellular radiator cores the surface is all in contact with water on one side and with air on the other, but in other makes indirect surfaces are employed to complete the cellular structure and fasten adjacent tubes together.

Air tube cellular cores are quite distinct from the other two types in that the tubes carry air instead of water while the space between them is filled with water. The difference between the fin and tube and the air tube cellular types is similar in a way to the difference between the water tube and fire tube types of steam boiler. In the first the tubes carry water and gases pass between them, while in the second the tubes carry gas and the water passes between.

Air tube cellular cores are the only type in which the water is not constrained to pass from header to header in the tube which it enters. In this type the water can flow across as well as downward through the core.

The tubes are spaced apart by expanding the ends or by use of a wire or strip of metal at the front and rear which is soldered in place. The tubes can have circular, hexagonal or square section. A core made in this fashion often has the same frontal appearance as other types, but the surface is all direct radiating type.

From the foregoing it will be seen that there is, in the absence of a recognized nomenclature, good reason for the confusion which exists. It has therefore been suggested that the matter be considered by the Radiator Division of the S. A. E. Standards Committee, in order that a standard terminology be formulated. The foregoing definitions are suggested for consideration in this connection.

Composite Aluminum and Cast Iron Piston

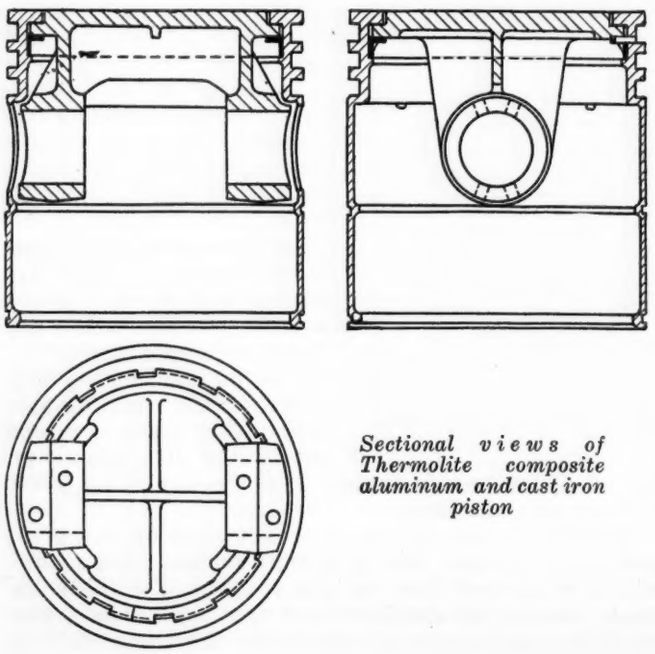
A COMPOSITE aluminum and cast iron piston has been brought out under the trade name, Thermolite. The central part of the piston head, the piston pin bosses, and the ribbing extending between the two, form a separate piece made of an aluminum alloy. The thrust of the explosion is taken directly on this aluminum part and the cast iron part acts merely as a sealing and guiding element.

An ingenious device is utilized for locking the two portions of the piston together. It consists of a drawn steel split collar with reinforcing webs for strength and to receive the spanner wrench. The lower face of the locking collar has twelve inclines or cam faces which engage twelve cam faces on the iron skirt and, when locked and pinned, constitute a positive lock.

It is claimed that these pistons weigh from 25 to 40 per cent less than cast iron pistons. Particular thermal advantages are also claimed for these pistons in that the heat conductivity of the aluminum head is three times as great as that of iron, resulting in a cool headed piston and helping to eliminate motor knocks.

Long life is also claimed for the piston, due to the fact that the wearing surfaces are of cast iron. Weight reduction results from the fact that the wall can be made as light as 3/64 in., because the iron does not carry any of the actual driving stresses. Simple radial ribbing is used on the skirt, the pin bosses being supported by the aluminum head, so that no distortion of the skirt by explosion impulses or the expansion of the mass of metal necessary for the formation of the piston pin boss can take place. Provision is made for the difference in the coefficient of expansion of the aluminum head and the iron skirt to prevent undesirable stresses. The explosion pressure is not transferred to the locking device, but is carried directly on the shoulder.

These pistons will be made for the replacement business as well as for original equipment. We are told that the cost is a little less than that of the regular aluminum pistons and a little less than that of cast iron pistons. The Muskegon Motor Specialties Co. is the manufacturer.



Sectional views of Thermolite composite aluminum and cast iron piston

THE gasoline consumption of South Africa has averaged about 7,500,000 gal. in the past five years. The consumption figures of 1920 and 1921 were 10,872,929 and 9,530,018 gal. respectively. Undoubtedly, a certain percentage of these totals has been used for building up reserve stocks which were practically non-existent during the war period and even up to the middle of 1920. This is apparent from the lessened imports in 1922.

Up to June, South Africa imported 4,453,373 gal. of motor spirit, including small amounts of naphtha and benzine, compared with 5,510,580 gal. in the corresponding five months of 1921 according to the Department of Commerce.

The United States and the Dutch East Indies have been practically the only countries supplying gasoline in this market, the share of each remaining fairly constant over the last five years. The figures for the Dutch East Indies represent the imports of the British Imperial Oil Company.

In addition to the numerous alcohol substitutes for gasoline that have been announced from time to time, oil shales have also been regarded as potential source of competition for gasoline, but, according to present indications, this source of sompetition will remain potential.

The Royal Dutch Shell interests have now publicly announced the results of their 1921 geological expedition to the Wakkerstroom oil shale field as follows: "under the present circumstances plans for further exploration and exploitation of the fields will probably have to be abandoned."

Moll Car, German Product, Designed for Quantity Production

Four cylinder engine, 2.75 bore and 3.94 stroke, turning radius of 14¾ ft., 118 in. wheelbase, ground clearance of 9 in. and weight of 2200 lbs., are chief characteristics. 30,000 in five years.

By Benno R. Dierfeld

A 2200-LB., four-cylinder car, designed for quantity production, is being produced in Germany by the Moll Works. The British Summers firm has contracted for 30,000 of these cars to be delivered within five years.

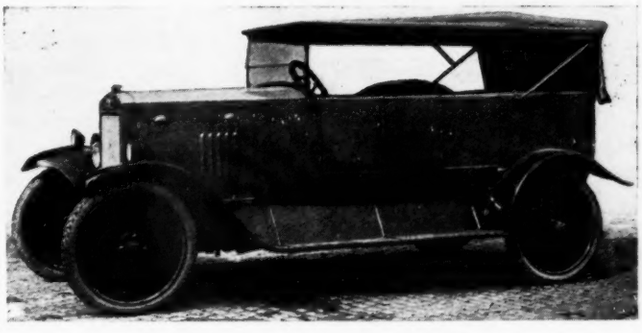
The engine is built by Siemens & Halske of Berlin and comprises four 2.75 by 3.94-in. cylinders, cast in a block with the top half of the crankcase. It develops 30 hp. at 2800 r.p.m. The valves are located in the detachable cylinder head and are operated by an overhead camshaft driven from the crankshaft through a vertical shaft and helical gearing. The pistons are of aluminum and the crankshaft runs in three ball bearings. Lubrication is by the circulating splash system, with vane pump. The inlet and exhaust manifolds are cast in the cylinder head, which is claimed to result in better carburetion and to give an engine very smooth outside lines.

The cooling water is circulated by gravity. The radiator is flat, instead of being of V-type, as found on practically all other German cars, and has a brass case and a ribbon type core. The two-bladed fan is cast of aluminum and driven by belt. Throttle control is by pedal only, the carbureter being a Zenith. A Siemens & Halske magneto with automatic spark advance is fitted. The gasoline tank has a capacity of 12 gallons and is located on the dashboard, the fuel being fed by gravity. An electric lighting and starting outfit is standard equipment. The starting motor operates on the toothed flywheel rim and the whole flywheel with motor drive is inclosed in a dust-proof case. The battery is carried between the running board and the frame side member. Both the output regulator and the automatic battery switch are inclosed within the housing over the commutator.

The inclosed cone clutch has asbestos fabric lining and is provided with a simple clutch brake. The clutch spring can be adjusted from outside the housing. Between the clutch and transmission there is a short shaft with two disk joints. The transmission has four forward speeds. All bearings are ball bearings and the gearshift lever is located in the center of car on the transmission cover plate. The propeller shaft has only a single universal joint, of the disk type. Torque is taken up by the propeller shaft tube which has a yoke forward end. The rear axle thrust is transmitted to the frame by the springs.

Final drive is by spiral bevel gears. The rear axle has ball bearings throughout and is of the semi-floating type. Its housing is a large steel casting with gear carrier and cover plate. A Dorr-Miller differential is fitted, this being manufactured in Germany under license by the Fischer A. G. in Schweinfurt.

Both brakes are internal and act directly on the rear wheels. The front axle, of the conventional type, is fitted with ball bearings. The rear springs are heavy quarter elliptics arranged diagonally and mounted beneath the frame side members. The frame members are parallel, which facilitates the mounting of the body. Either steel spoke or steel disk wheels of the demountable type are fitted with 30 x 3½ in. tires.

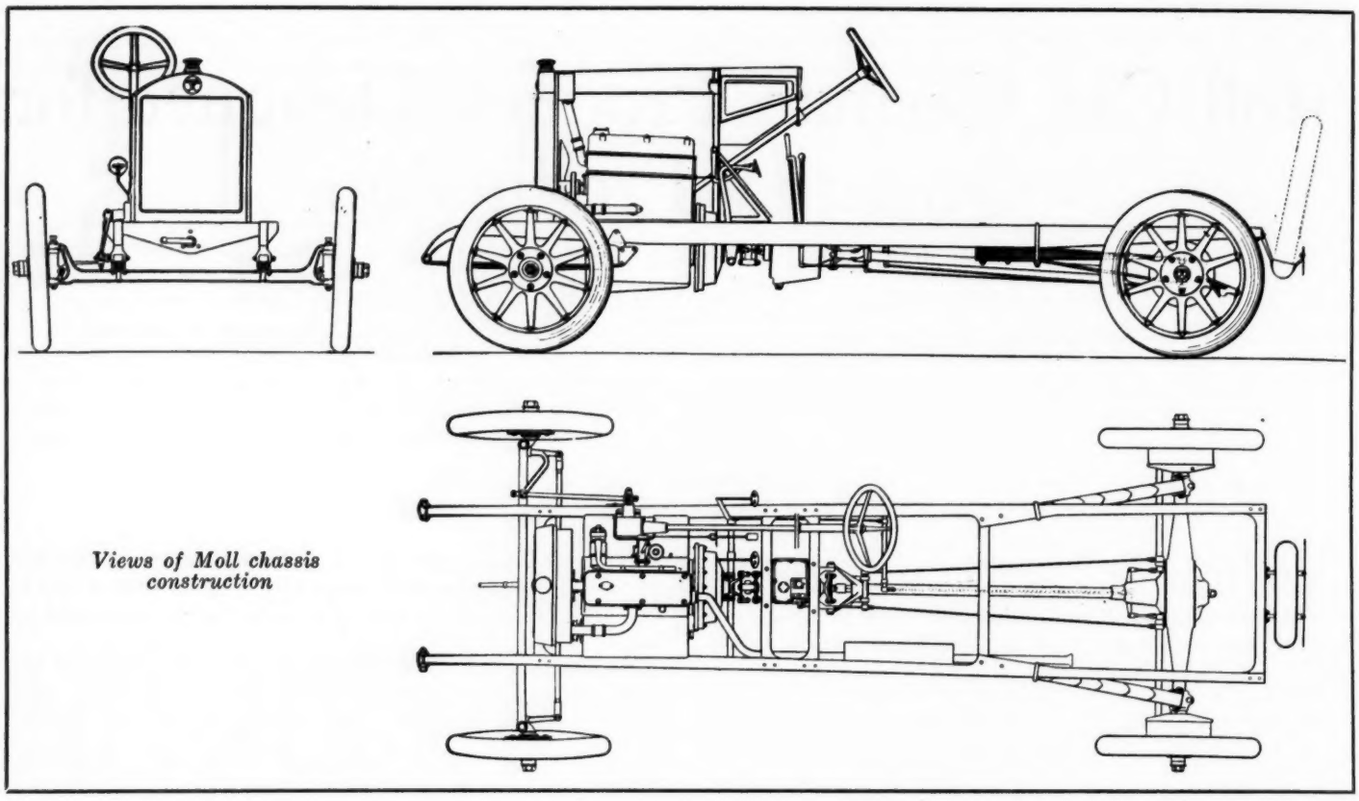


The Moll car, of German origin, designed for quantity production

From the photographic view of the car it will be seen that the top does not disappear in the body, that the windshield is not pointed and that side lamps are mounted on top of the pressed steel fenders. The car has a wheelbase of 118 in., a tread of 55 in., a ground clearance of 9 in. and turns in a radius of 14¾ ft. The open car in condition ready for the road weighs 2200 lb. and has a maximum speed of 56 m.p.h.

The production proposed for this new car is larger than any previously attempted in Germany. The Moll Works, which is making the car, comprises several medium-sized plants in and near Chemnitz which previously manufactured machinery of different types, especially for autogenous welding. During the summer of 1921 the British Summers firm entered into an agreement with the Moll Works whereby the latter were to deliver within a period of five years 30,000 cars of a light and inexpensive type.

One plant of the Moll Works was devoted to the manufacture of the car, but it was far too small to produce 6000 complete machines a year, so the engine and other chief components were purchased from or built under contract by other manufacturers, the Moll Works con-



Views of Moll chassis construction

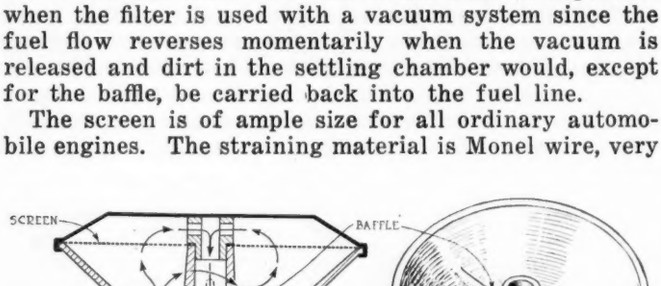
fining themselves almost entirely to assembling. Rumor had it that English engineers were to furnish the design but this evidently meant only that they laid down the general lines of the car, for all the most important parts such as the engine were wholly designed by German engineers and design follows German practice throughout.

A New Gasoline Filter

A FILTER which combines in a simple structure a number of important features frequently overlooked in filter design, is being marketed by the Standard Filter Co.

The device is an inverted cone about 3 in. in diameter with a screen near the top. Fuel enters at one side, as indicated by the arrows in the accompanying cut, and passes over the baffle, which divides the conical settling bowl into two parts. The dirt falls beyond the baffle, while the liquid fuel passes up through the screen, and down through a central tube to the carburetor or vacuum tank. The use of the baffle is important when the filter is used with a vacuum system since the fuel flow reverses momentarily when the vacuum is released and dirt in the settling chamber would, except for the baffle, be carried back into the fuel line.

The screen is of ample size for all ordinary automobile engines. The straining material is Monel wire, very closely woven in layers, quite different from the ordinary wire mesh. The inlet and outlet are tapped with ⅛-in. pipe thread and are interchangeable, that is, the filter is right or left hand, as desired.



The Standard fuel filter

The instructions placed on the top of the filter read: To clean, drain only; to test passage blow into outlet. Drain sediment from main tank yearly.

Since the velocity of flow through the screen is low and the flow is upward there is little tendency for clogging, while the screen is non-corrosive. Opening the drain flushes out the sediment chamber without dismantling. In fact, the filter is sealed at the top by a sheet metal cover which is spun on and is therefore not removable. The bowl is of such shape that if any water collects in it and becomes frozen it will not crack the aluminum casting. The device is simple to manufacture and easy to install.

SPARKING PLUGS, by A. P. Young and H. Warren; published by Sir Isaac Pitman & Sons, Ltd., Bath, England, treats the subject of sparking plugs in a technical manner. Much of the subject matter is based on experimental work done by the authors in the Research Laboratories of the British Thomson-Houston Co. The book contains 106 pages and 64 illustrations.

The first chapter discusses the history and general principles of electric ignition. Succeeding chapters deal with sparking plug design, plug electrodes and the composition and properties of plug insulators. Numerous standard makes of plugs are described in the final chapter.

New 14-Cylinder Air Cooled Radial Engine of British Design

Armstrong-Siddeley "Jaguar" passes test to comply with British Air Ministry "ideal specification" thought unattainable. Enclosed fan serves as mixture distributor and provides forced induction effect. Sample engines ordered by United States Government.

By M. W. Bourdon

A BRITISH aero engine which has gained considerable prominence during the past few months is the fourteen-cylinder air-cooled radial type known as the Jaguar and made by Armstrong-Siddeley Motors, Ltd., Coventry, England. It is stated that the original design of this engine, and of a seven-cylinder model (the Lynx) made by the same firm on similar lines, was the result of the issue of an "ideal specification" by the British Air Ministry as far back as 1917.

The "ideal specification" was considered at the time to contain certain provisions which were not practically attainable, and it is doubtful whether those who drew it up realized the number and nature of the problems to be solved before an engine to comply with it could be produced. But the Jaguar engine has now passed the "type-test" imposed by the British Air Ministry, a test which of late has been made considerably more difficult to pass. Under the new regulations, five 10-hour non-stop runs are called for, instead of one such run plus 40 hours running completed in convenient instalments.

Samples of this engine have been ordered by the American Government, but at the moment of writing have not been shipped.

The Jaguar engine has its fourteen cylinders (5 x 5½ in. bore and stroke) arranged in two staggered rows, from which it follows that a two-throw crankshaft is used. Dealing first with the cylinder design, each of these has a barrel machined from the solid steel with integral and horizontal fins extending right down to the crank case. The head is separate and of an aluminum alloy; it is screwed over the threaded upper end of the barrel and has an abutment in the form of a bevelled shoulder and a lock-nut which also constitutes one of the steel radiating fins of the barrel.

The valve seats in the head are of bronze, as also are the guides and the spark plug bosses; there are three holes for the latter in the aluminum, though two only are used, the third being filled by a screwed plug removable, if need be, for cylinder priming, though a third spark plug instead can be fitted if desired.

The cylinder is secured to the crank case through the agency of a flanged steel sleeve or adapter, the latter located in the hole in the aluminum crankcase by means of set screws. Into this sleeve the threaded lower end of the cylinder is screwed until the valve gear and ports are in correct alignment, when the cylinder is locked in position by a split and double-coned locking ring, the ends of which are drawn together by a pinch-bolt. The bevels of the ring have seatings on crank case and barrel respectively, so that tightening the pinch-bolt imposes thrust in opposite directions upon the threads of sleeve and cylinder as in the case of an ordinary lock nut.

The engine body consists of three parts, i.e., the crank case proper and two end covers. The rear end cover houses one of the crankshaft bearings, while the front main bearing is located at the center of an integral wall between the crank case interior and the front cover. The latter carries another main journal and the thrust bearings and encloses the auxiliary drives for cams, ignition gear and oil pumps.

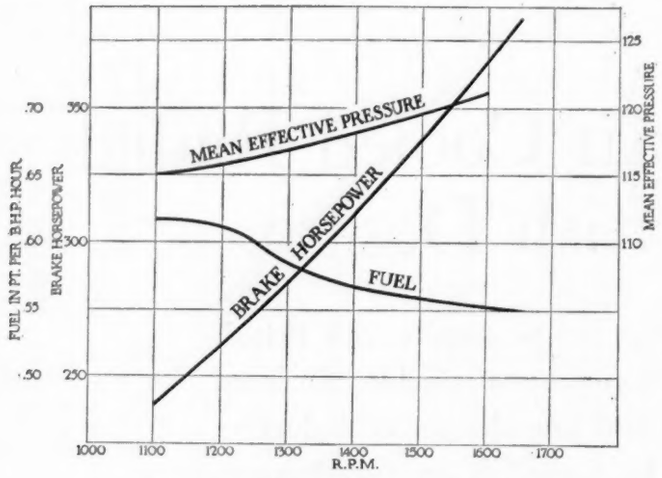
Each cylinder has only two valves. The inlet and exhaust valves, operated by push rods and rockers, are changeable, being of the same design, material and dimensions; they are of approximately 2 in. overall diameter and are tulip shaped. There are two short concentric springs for each valve, the coned spring abutment plate being located by a split steel cone which screws on to the valve stem and is pinched tight on the threads of the latter by spring pressure exerted through the conings. Duplicated springs of U-form are applied to each valve rocker to assist in the return of the latter and to keep the rocker, pushrod and cam follower in contact.

Latticed Design Rockers

The rockers are of latticed design and each pivots on two ball bearings located in standards screwing into brackets integral with the aluminum cylinder head. The pushrods are formed of steel tubes with spherical end pieces. Roller-type cam followers are used, the rollers being about 1½ in. in diameter. They resemble four-spoked steel wheels with integral axles.

Valve actuation is by means of two cam rings, one for exhaust and one for inlet, bolted together to form a unit having an internally toothed flange driven by a train of straight-toothed pinions from the front end of the crankshaft. Each ring has three cams and rotates at one-sixth engine speed.

The two-throw crankshaft has three parallel-sided roller journals and a double-thrust ball bearing at the propeller end. It has bronze counterbalance weights bolted to extensions of the outer webs and is drilled for lubrication purposes. Each master connecting rod is of H-section, while the six auxiliary or anchor rods are tubular. All rods are machined all over.



Jaguar engine performance curves

The master ring or big-end is a split steel bearing shell of two dissimilar parts with side webs carrying the connecting rod pins, the webs being extended in the line of the master rod to accommodate the second pin which in effect makes the big-end and master rod a single unit. The pins for the auxiliary rods float in bronze bushes in the big-end webs and there are floating bronze bushes in the rod ends; the pins are located axially by rings of spring steel sprung into grooves. The big-end bearing is of the white metal cast direct into the shell.

Short skirted aluminum pistons (standard weight, 2 lb. 4¼ oz.) are used. There are two compression rings and two scraper rings; the latter are chamfered at their upper edges and lie in grooves with bevelled lower edges, holes passing from the bevels to the piston interior. The upper scraper ring is immediately below the two gas rings and supplements the latter in retaining compression, while the lower scraper is at the bottom of the piston skirt. The hollow wrist pin floats in the bosses of the piston and in a floating bush in the connecting rod end.

The lubrication is, of course, by the dry sump system. There is a dual pump of which the scavenger section has 30-35 per cent greater capacity than the feed section. Both pumps or sections are of the gear type, with duralumin pinions, and are driven by skew gear from the front end of the crankshaft, the drive shaft being continued upward with a coupling to drive one of the two ignition distributors. The scavenger section draws from a small sump which is bolted to the bottom of the crankcase and which communicates with the latter by way of holes through which drains the surplus oil.

Oil Filter Design

This sump also forms the casing of a coarse filter. A second filter with a finer mesh gauze is located on the delivery side of the feed pump. This second filter has its gauze in a lanterned frame with a coned seating backed by a helical spring and is so arranged that, in the event of the gauze becoming choked, the lantern is forced by oil pressure off its seating and the engine is lubricated for the time being by oil strained only by the coarse filter.

The feed pump delivers to the front end of the crankshaft which is drilled at that end to receive a distributing unit; the latter, in conjunction with dual drilling in two of the crank cheeks and distributing pipes in the hollow pins, causes oil that is in excess of the needs of the big-end bearings to return to the front end of the shaft and issue there to lubricate the cams and distribution gearing. By this system there is no liability for the crank case to be flooded with oil, for there is no "dead-end" to the passages leading to the crank pins and the end clearances of the big-end bearings and crank cheeks permit only sufficient oil to issue to provide for the efficient lubrication of the pistons, journal bearings and other internal working parts.

The oil pressure release valve is set to operate at 50 lb. per sq. in., and the pressure gage is connected to the circuit between the fine mesh filter and the crankshaft, so that it indicates the actual pressure of oil reaching the shaft and not that existing to force oil through a partly clogged filter.

A dual carbureter is bolted to the back cover of the crank case. Besides its initial purpose in enclosing that end of the crank chamber, this cover comprises a distributing chamber for the mixture and also a heating jacket. Through the latter the engine oil is circulated, thus assisting vaporization and cooling the oil. Within the distributing chamber, from which radiate seven branched intake pipes, is a fan or blower rotating at crankshaft speed. The mixture is fed through the center of the rotating unit, and thus the fuel and air are thoroughly mixed and more even distribution is claimed; further, at high speeds a certain degree of forced induction effect is obtained.

To comply with varying requirements, both magneto and battery ignitions are provided for; the latter has been used up to the present and will be found on the engines for the American Government, but either one type or the other can be fitted. When the battery system is used, the two fourteen-point distributors are arranged, as seen in one of the accompanying photographs, at the propeller end, the generator being driven from the rear end of the crankshaft. When magneto ignition is fitted the two machines—for the ignition outfit is duplicated with either system—are driven by bevel gearing from the rear end.

The mounting of this engine in the fuselage is accomplished by means of a pressed steel coned-shaped unit, machined inside and outside, and secured by its flange to studs extending from the rear of the engine body.

The following are some of the more important specifications of this engine and some details of the type-test made by the British Air Ministry:

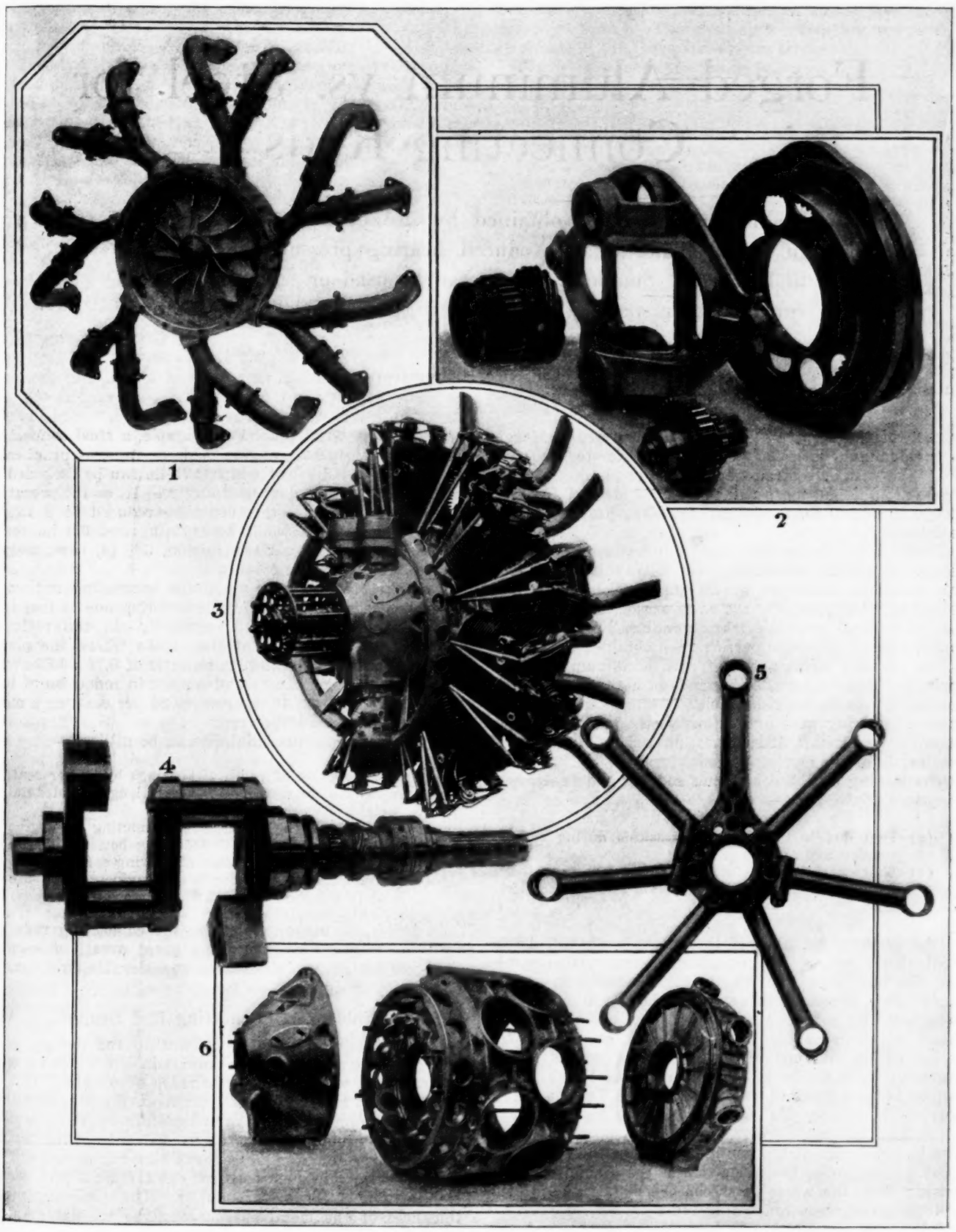
No. of Cylinders	14
Bore	5 in.
Stroke	5½ in.
Normal rated b.h.p.	320
Maximum rated b.h.p.	360
Normal r.p.m.	1,500
Maximum recommended r.p.m.	1,650
Weight	710 lbs.
Compression ratio	5 to 1
Length, overall	46.5 in.
Diameter—over cylinder heads	43 in.

Endurance Tests

Conducted by British Air Ministry.

No.	Time Hrs.	Time Min.	Average brake hp.	Brake hp corr.
1	9	55	284.6	
1a		5	330.2	331.4
2	9	55	294.1	
2a		5	329.7	330.4
3	9	55	293.6	
3a		5	326.0	326.0
4	9	55	293.9	
4a		5	....	330.0
5	9	0	292.8	
5a	1	0	....	342.2

Slow run, 30 mins. at 737 r.p.m.
High speed run, 1 hr. at 1751 r.p.m. 267 b.h.p.
High power test, 1 hr. at 1648 r.p.m. 373.5 b.h.p.
Average fuel consumption, .581 pt. per b.hp. hr.
Average oil consumption, .02 pt. per b.hp. hr.



1—Mixture distributor casing and intake pipes of Jaguar engine; within the casing is shown the fan or blower which rotates at crankshaft speed and tends to provide a forced induction effect besides thoroughly mixing and distributing the fuel and air. 2—Valve actuating cam rings and distribution gear. 3—Jaguar 14-cylinder engine. Front end view showing the two 14-point distributors of the generator ignition system. 4—The two-throw crankshaft showing bronze counterbalance weights bolted to outer web extensions. 5—H-section master connecting rods and tubular auxiliary or anchor rods shown with big end assembly. 6—Crankcase and end covers of the Jaguar engine

Forged Aluminum vs. Steel for Connecting Rods

Reduction in weight, obtained by use of aluminum, results in reduced inertia and reduced bearing pressures, according to Pomeroy. Smaller bearings can be used or engines can be run at higher speeds. Manufacturing advantages also present.

By Laurence H. Pomeroy *

FROM the point of view of specific strength forged aluminum is greatly superior to the steels used in the vast bulk of automotive engine connecting rods, where from the *strength* point of view a steel giving from 80,000 to 90,000 lb. tensile strength has proved perfecty satisfactory.

There is no doubt but that the development of the forged aluminum connecting rod follows logically from the aluminum piston to which many makers have been forced to return, and for the same reason, i.e., the reduction of internal wear and tear in engines by 50 per cent, and the vastly improved performance obtained thereby.

The primary advantage of forged aluminum as a material for high duty connecting rods in high speed internal combustion engines arises from the fact that the chief cause of bearing wear and failure is the loading imposed upon the crankshaft and connecting rod bearings due to the inertia of the moving parts.

The loading on the connecting rod big end bearings is composed of two parts—

(*a*) That due to the cylinder pressures during compression and expansion
(*b*) That due to inertia forces arising solely from the mass of moving parts, i. e. piston and connecting rod

In only three positions of the crankpin (out of 12 investigated), namely, the end of the compression stroke and the beginning and middle of the explosion stroke, do the fluid pressures in any appreciable way counteract the effect of the inertia pressures. The pressure on the inside of the crankpin bearing due to the centrifugal action of the big end of the connecting rod is always present. This action is approximately that due to the weight of the big end of the connecting rod, i.e., the weight obtained by placing the big end of the rod on a scale pan, while the small end is freely supported in space. It should also be noted that at the top and bottom of the stroke, the inertia pressure on the inner side of the crankpin is that arising from the whole mass concerned, i.e., piston complete *plus* the whole connecting rod.

In general the inertia effect of the connecting rod may be considered as if the weight of the big end, as previously described, is concentrated to the crankpin; while the difference between this weight and that of the whole connecting rod, i.e., the weight of the small end, is concentrated at the wrist pin. For example, a steel connecting rod for a 3½-in bore engine made as light as practicable weighs about 3.5 lb., of which 2.75 lb. can be reckoned as rotating mass, and the remaining 0.75 lb. as reciprocating mass. In aluminum this could be reduced to 2 lb., of which about 1.5 lb. would be rotating and 0.5 lb. reciprocating mass. A cast iron piston, 3½ in. bore, weighs about 2.25 lb. complete.

The effect of using an aluminum connecting rod would in such a case reduce the big end loading due to inertia—neglecting connecting rod angularity—in the ratio of 2.5 : 1.5 at the middle of the stroke where the piston inertia forces vanish, and in the ratio of 5.75 : 4.25 at the ends of the strokes, i.e., an advantage in reduction of load factor varying from 40 per cent to 26 per cent, or a mean reduction of some 33 per cent.

The advantage thus obtained can be utilized—

(*a*) By reduction of width of bearings by 33 per cent, which in turn reduces overall length and total weight of engine
(*b*) By reducing the gear ratio and running the engine at a higher speed thus obtaining better performance with the same factor of bearing safety
(*c*) By improving this factor in engines which are unduly supplied with bearing surface

In brief, the use of aluminum for connecting rods affords a ready means of making great overall economies in a new design and of allowing considerable development of existing designs.

Problem of Connecting Rod Design

The greatest difficulty in connecting rod design is to give adequate support to the babbitt in direct contact with the crankpin without undue increase of weight. This is not a matter of strength of the supporting means, either steel or aluminum, but of securing stiffness. In this connection aluminum is particularly valuable owing to its low density. For example, a connecting rod to suit a 2-in. diameter crankpin must be bored out at least 2⅛ in. diameter, leaving 1/16 in. for babbitt. The necessary mean thickness of the metal surrounding the babbitt in steel should be at least ¼ in., neglecting big end bolt bosses, etc. The mass of such a big end in steel is, therefore, proportional, the difference between the squares of the outside and inside diameters multiplied by the density or

$$2\tfrac{5}{8}^2 - 2\tfrac{1}{8}^2 \times 0.28 - 0.7.$$

The stiffness for the same internal diameter is approxi-

*Consulting engineer, Aluminum Manufactures, Inc. Excerpt from paper read before Buffalo Section, Society of Automotive Engineers.

mately proportional to the mean thickness^3 × modulus of elasticity =

$$0.25^3 \times 30{,}000{,}000 = 468{,}750.$$

Since the stiffness of a part is proportional to its modulus of elasticity, other things being equal, and as the modulus of elasticity of aluminum is 10,000,000, while that of steel is 30,000,000, it follows that to obtain the same stiffness of the big end in aluminum as in steel the thickness must be increased according the

$$\sqrt[3]{\frac{30{,}000{,}000}{10{,}000{,}000}} = 1.44 : 1.$$

The equivalent thickness, therefore, in the above example becomes

$$0.25 \times 1.44 = 0.36 \text{ in.}$$

From this the relative weight of the aluminum big end is, as before, proportional to the difference of the squares of the outside and inside diameter multiplied by the density or

$$2.845^2 - 2\tfrac{1}{8}^2 \times 0.1 = 0.36.$$

From this it will be seen that the same stiffness can be obtained in an aluminum rod for about one-half the weight of material required in a steel construction. Apart from the amount of metal required to give the desired stiffness of bearing support, the question arises as to the number of bolts for securing the big end bearing cap. As a rule four bolts make a much better job than two and incidentally need be no heavier. It is important to provide plenty of bearing surface between the cap and its abutment on the connecting rod. The proportions of the small end of the connecting rod are dependent upon the vagaries of the designer of the wrist pin, but it should be kept in mind that the weakest part of the wrist pin is in a vertical engine at the top of the rod through which an oil hole is generally drilled. The metal at this point should be two and one-half to three times as thick as at the sides of the wrist pin.

Coming now to the proportions of the shank of the connecting rod, in the present state of knowledge it appears to be perfectly safe to make the section of an aluminum rod which replaces a reliable steel rod similar in shape of twice the area. All designers will realize the number of exceptions there may be to this rule and the desirability of consultation with the prospective suppliers of the aluminum connecting rod forgings.

The effect of aluminum connecting rods as affecting crankshaft bearing design is also important. Many engine builders use counterbalanced crankshafts to reduce main bearing wear, particularly on middle main bearings. There are, however, certain distinct objections to this practice. In the first place, a counterbalanced crankshaft is heavy and expensive, and, in the second, it introduces a distinct liability to torsional periodicity, particularly in six-cylinder engines.

Reduction of Bearing Wear

The necessity for such crankshafts arose from bearing wear due to heavy pistons and connecting rods. The use of aluminum rods reduces very considerably the crankshaft skipping rope action which causes bearing wear, while in combination with aluminum pistons as well, it is safe to say that counterbalanced crankshafts are unwarranted and disadvantageous.

An interesting example of the truth of the foregoing remarks is obtained by comparing the characteristics of a steel connecting rod taken from one of the best four-cylinder engines produced and an aluminum rod which has done many thousands of miles under most exacting conditions without a suspension or failure. The only criticism that can be urged against the steel connecting rod under discussion is that it is too light, particularly in respect of the metal supporting the babbitted shell in the big end. The steel connecting rod is from an engine 3⅜ in. bore and 5 in. stroke. The aluminum connecting rod is from an engine 4⅛ in. bore and 4¼ in. stroke.

The detail dimensions are as follows:

	Steel	Aluminum
Length between centers	12⅛	11⅝
Diameter of big end bearing	1⅞	2
Length of big end bearing	2¼	2¼
Diameter of wrist pin bearing	⅞	1⅛
Length of wrist pin bearing	1¼	1⅝
Total weight of rod	2.9 lbs.	2.14 lbs.
Weight of big end	2.34	1.69
Weight of small end	.56	.45

WEIGHT OF PISTONS (ALUMINUM IN EACH CASE)

Complete with wrist pin and 3 rings 1.206 lbs.
Complete with wrist pin and 4 rings 2.04 lbs.

TOTAL RECIPROCATING WEIGHT

Weight of Small End		Weight of Piston Complete	
.56	1.206	.45	2.04
1.766 lbs.		2.49 lbs.	

TOTAL ROTATING MASS

i. e. weight of big end of connecting rod

2.34 lbs. 1.69 lbs.

Now, as previously stated, the loading of the crankpin bearing due to inertia forces is in part due to the centrifugal effects of the rotating mass of the big end of the connecting rod itself and in part due to the reciprocating inertia effects of the piston and connecting rod small end. These latter apply at the top and bottom of the stroke only while the former acts continuously. The mean loading, therefore, is that due to the rotating mass of the big end plus *half* that due to the reciprocating masses, as these are fully manifested only at each end of the stroke and vanish about the middle thereof.

Determination of Pressures

The actual pressures manifested are directly proportional to the weight of the parts in question, the square of the r.p.m. and the stroke. In comparing the two connecting rods, however, the speed of the engine may be neglected, as the comparison between the two rods at any engine speed will hold at any other. We have, then, the average loading of crankpin proportional to

$$\text{Stroke} \times \frac{\text{weight of reciprocating parts}}{2} + \text{weight of rotating parts.}$$

For the steel rod this becomes

$$5 \times \left(\frac{1.766}{2} + 2.34\right) = 16.1.$$

While for the aluminum rod the loading is proportional to

$$4\tfrac{1}{4} \times \left(\frac{2.49}{2} + 1.69\right) = 12.5.$$

The advantage obtained in reduction of big end bearing pressures by the use of aluminum connecting rods is thus clearly manifest, especially when it is noted that in each case aluminum pistons (incidentally of similar design) were used. The argument, however, goes much further than this, as the engine in which the steel rods are fitted is 3⅜ in. bore x 5 in. stroke, while that with the aluminum rods is 4⅛ in. bore x 4¼ in. stroke. The final result may be computed either in terms of cylinder capacity or of piston area. In the former the inertia effects of the steel rod are proportional to $\frac{16.1}{45} = 0.368$, while for the aluminum rod this "figure of merit" becomes $\frac{12.5}{55} = 0.228$.

Figured on the basis of piston area the comparison becomes $\frac{16.1}{8.9} = 1.81$ for the steel rod, and $\frac{12.5}{13.3} = 0.94$ for the aluminum rod.

These figures are sufficiently striking to justify attention, and would be even more remarkable if the engine with steel connecting rods was designed to reduce secondary unbalanced forces to the same extent by having the same ratio of connecting rod length to crank-throw as that in which the aluminum rods are used. This inherent advantage of the short stroke engine can, however, be thrown in and still leave the argument for the aluminum connecting rod in its above convincing state.

Comparative Tests

Summing up, as between two engines, one 3⅜ x 5 in. and the other 4⅛ x 4¼ in., each using aluminum pistons and both of really modern design, the inertia effects which determine the capacity of the engine to resist wear and tear of bearings are reduced by 38 per cent or 48 per cent by the use of aluminum connecting rods, depending upon whether the cylinder capacity or the piston area is used as a basis for comparison. If it is argued that in the case of the engine with steel rods the wear and tear is satisfactory from the user's point of view, the figures then show clearly the possibilities of reducing the size of the bearings, the overall length of the engine and the weight of material required for a given result.

In addition to the above analysis of bearing loading it may be of interest to compare the strength of the aluminum and steel rods. Considered as a strut the strength of a connecting rod is directly proportional to the moment of inertia of its cross section at the point of maximum stress (approximately midway between the ends), the modulus of elasticity of the material and inversely proportional to the square of its length. The student will recognize the above as the basis of Eulers' formula, which is used as a ready means of comparison for the reason that the relation of the length of automobile connecting rods to their cross section does not vary greatly in practice. The moments of inertia of the cross sections of the connecting rods are 0.024 and 0.090 in.^{4} units, for the steel and aluminum rods respectively.

The relative load carrying capacity is then

$$\frac{0.024 \times 30{,}000{,}000}{12.125^2} = 4900 \text{ for the steel connecting rod,}$$

$$\frac{0.090 \times 10{,}000{,}000}{11.625^2} = 6650 \text{ for the aluminum connecting rod,}$$

i.e., the relative strengths of the steel and aluminum rods are as 1 :1.36, the relative piston areas and total explosion pressure being as 1: 1.5.

On this reckoning it will be seen that the aluminum rod is not proportionally so strong as the steel rod. On the other hand, the aluminum rod in question has been subject to most drastic running without a suspicion of failure, and from all practical points of view is well up to its job.

Complex Pressure Calculations

The truth is that the loading of a connecting rod is so complex that it is difficult to reduce it to calculation. If engines were run at full throttle continuously at low speeds the explosion pressure would be the determinant of the design. Just as the speed increases to that at which engines normally run, so do the inertia effects cancel out those of the fluid pressure, while at the very partial throttle required to run an automobile at, say, 30 m.p.h. the inertia effects completely overwhelm those of the explosion. Further, the compressive stresses set up by the explosion are not nearly so harmful as the alternating stress induced by inertia, so that the above discussion in respect of the explosion pressure is of not much more than academic interest.

In practice it is difficult or impossible to forge steel rods of sufficiently light section, and subsequent machining is necessary to obtain the best results in respect of strength and lightness. The steel rod, in fact, suffers from excessive strength and insufficient stiffness. Even if machining is resorted to in order to reduce the weight of the rod, the extent to which this can be done is practically limited to the shank of the rod, and the resultant effect is but small. For example, on the steel rod in question the reduction of the average section of the rod to 1/16 in. thickness instead of the average 7/64 in. aimed at in forging would reduce the weight by some 3 oz. only, i.e., about 6 per cent, an insignificant result compared to that easily attainable by the use of forged aluminum.

The general methods of manufacture applied to steel connecting rods are equally applicable to aluminum. In aluminum rods machining the shank to reduce weight may be dispensed with, as the consequent reduction of weight is negligible. Further, there is no necessity for bushing the small end of the rod, although such bushing may be desirable in the case of small bore engines where the wrist pin is necessarily short. Similarly with aluminum rods the same babbitted shells may be used as with steel rods, although this practice is regarded as mechanically deficient either with steel or aluminum rods.

The use of the babbitted shell necessitates increasing the total weight of the big end to compensate for the additional diameter of the big end bore necessitated by the shell. More important still, the heat generated by big end friction *and* that conducted down the rod from the hot region near the piston, has to be dissipated through two oil films, i.e., that between the babbitted shell and the crankpin itself, and that between the outside of the babbitted shell and the connecting rod big end proper. As the whole object of a bearing is to readily dissipate the heat generated by friction, it is difficult to see why its conductivity should be reduced by 50 per cent.

Direct Babbitting Favored

It may be argued that the advantage of the babbitted shell lies in its capacity for ready replacement. While this may be true, the percentage of bearing failures when babbitted shells are not used is so small as to make it more satisfactory and economical to replace the whole connecting rod. As in many other instances in automobile design, the provision made for replacement make the replacement necessary. On the above grounds the use of direct babbitted connecting rods is strongly urged. From the manufacturing point of view there is no more difficulty than in babbitting a bronze shell and there is the manufacturing economy obtained by dispensing with the shell.

Successful methods of babbitting aluminum connecting rods have been developed both from the point of view of a complete technical solution of the problem and of rapid economical manufacture.

The results of these methods are such that the babbitt in a connecting rod can only be removed by melting or laborious chipping. There is a definite metallic fusion between the aluminum and the babbitt which it is practically impossible to obtain with steel or bronze.

OWNERS registering passenger cars in the Province of Ontario, Canada, are required to give their occupation in addition to the other information commonly asked. This practice makes it possible to compile figures giving ownership of cars by occupations, thus furnishing interesting and valuable information for manufacturers from a sales standpoint. State motor vehicle departments in the United States could well add this question to their registration blank requirements.

Testing Spiral Bevel Gears in Manufacture

Character of tooth bearing and silence of operation determined by recently developed machine. Handles all sizes of motor vehicle gears. Special attention given to rapid work.

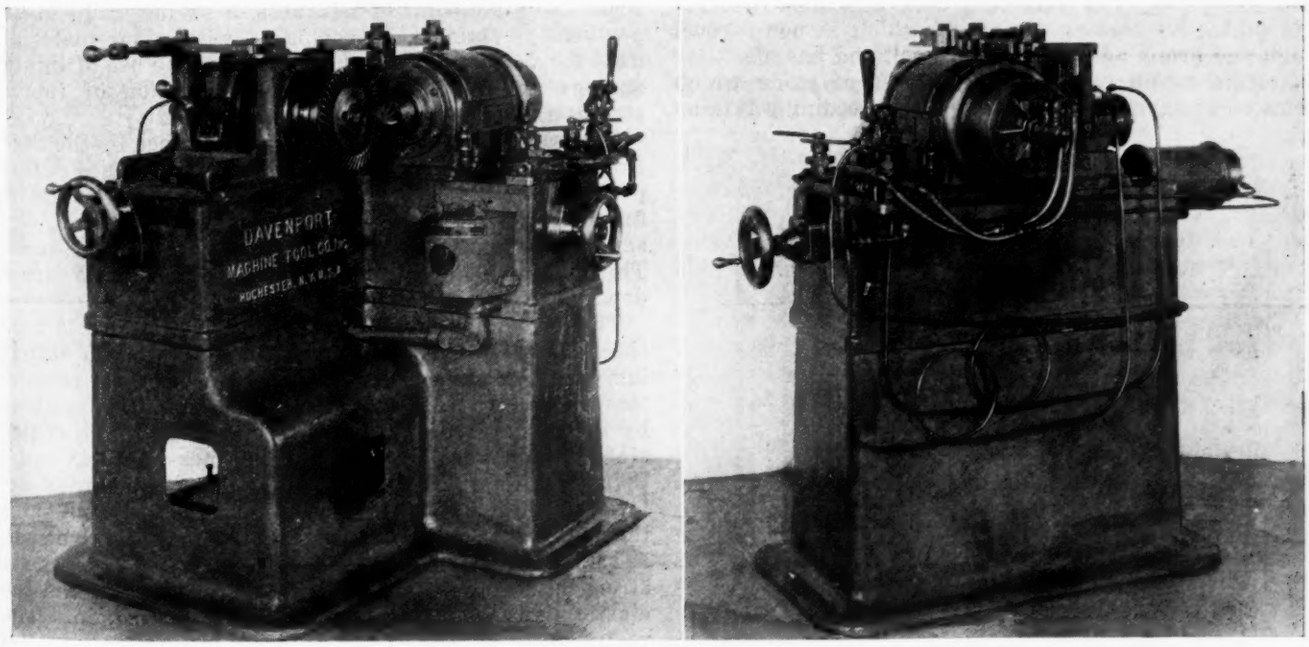
IN the manufacture of spiral bevel gears it is desirable to test for character of tooth bearing and silent operation and to determine the center distances which insure the best tooth bearing and the quietest operation. For this purpose a shop testing machine has been developed by the Davenport Machine Tool Co., Inc.

In the design of this machine special attention was paid to rigidity of frame construction and to rapid operation. There are two headstocks for holding the gear spindles, and these have large bearing surfaces on the bed and a deep dovetail slide with a taper gib extending the entire length of the slide. In addition, provision is made for tightly clamping the headstock to the bed by means of bolts passing through the headstock into blocks in T slots in the bed. These bolts are placed as close as possible to the bearing, the object being to make the headstock and bed practically one piece during the test.

Owing to the fact that in the use of the testing machine there is usually but little need for changing the position of the left hand headstock, on which the crown gear is mounted, this is clamped down by a lever secured to one of the hold-down bolts, with an adjustable connection to the second bolt in order to insure equal tightening of both in one operation. The right hand headstock is moved quite a distance each time a pinion or gear is changed for testing, and in order to make quick operation possible, a compressed air device is provided. A cylinder is mounted on the back side of the machine which moves the slide a fixed distance, and after the slide has been drawn back and the pinion changed, the new pinion is brought into mesh with the crown gear in exactly the same position as the previous one, or it can be adjusted to any other position, as the operator may desire. This adjustment is made by means of the hand wheel with graduated dial located underneath the right hand headstock.

Getting Quick Adjustments

As the right hand headstock has to be moved many times a day, provision is made for clamping it by means of an air cylinder, and the machine is also fitted with an air chuck for quickly clamping the pinions. In the front view of the machine may be seen three valves which serve the following purposes: The first is used for clamping the work in the spindle, the next for moving the slide until the pinion and gear mesh, and the third for clamping the headstock. A similar movement of these handles performs these operations in the proper sequence, while moving the handles in the opposite direction unclamps the headstock, moves back the slide and releases the pinion. Both spindles are mounted in large annular ball bearings



1—Davenport spiral bevel gear testing machine showing gears in position. 2—Another view of the gear testing machine plainly showing the three air valves (handles) by which it is controlled

at both ends, with an arrangement for keeping the oil in the bearings at a constant height.

The drive is by an electric motor mounted inside the base. A reversing switch is provided which permits of driving the spindles in both directions. Connections are made from the motor to the slide in such a manner that the belt tension is not affected as the slide moves back and forth. There is a band brake on the crown gear headstock, and the exhaust from the air cylinders is piped onto the band of this brake to keep it cool. However, if desired this brake may be cooled by water.

This machine will take gears of all sizes used in motor car work. It has a net weight of about 1500 lb. and occupies 4 ft. square floor space. The electric motor is of 3-hp. capacity and is furnished for operation on either direct or alternating current circuits.

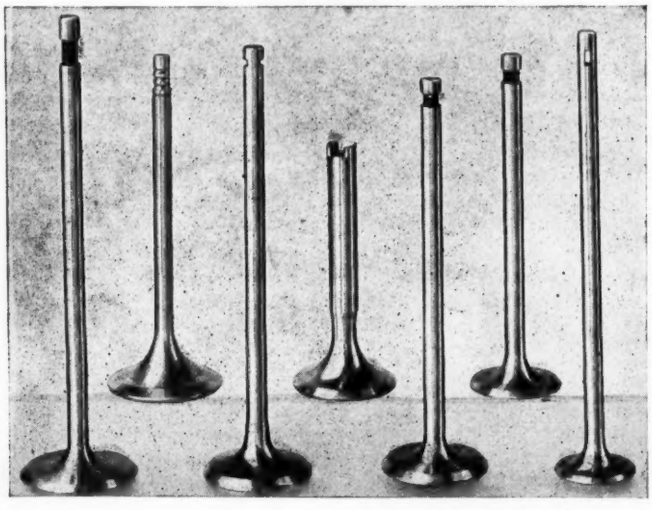
A New Material for Poppet Valves

FOR a considerable period in engine development the valve was the most delicate part. As compressions increased and combustion chamber temperatures went up, especially in aircraft engines, valve pitting and corrosion of the head and stem became more frequent. A great many papers and discussions on the subject have been given before engineering societies and printed in the technical press and during the past three or four years the trouble has noticeably decreased.

One of the newer valve materials, about which nothing has appeared in the public print so far is known as Thompson Silcrome. This is a chromium-silicon alloy of a composition designed to develop to the fullest extent the heat-resisting qualities of the two elements and at the same time give a material that can be machined accurately on a commercial basis.

The properties which are sought in any valve material are resistance to corrosion at high temperature (burning), resistance to wear on guide, resistance to wear or deformation at bottom of stem, absence of air-hardening qualities at working temperatures, ease of forming seat, lightness, easy action on cast-iron valve seat, ability to form in one piece, non-warping qualities and stainless qualities. Thompson Silcrome, when considered with respect to these different requirements, offers a good illustration of the progress in valve materials in recent years.

The manufacturers state that the alloy can be melted under the oxy-acetylene cutting flame, but that it cannot be cut or burned. They further state that when the alloy is heated to a temperature of 1500 deg. Fahr. a thin protective coating is formed which is non-porous, tough and firmly adherent to the steel, and has a similar protective action to that of the layer of oxide which forms on aluminum. This coating is exceedingly thin as may be judged by the fact that a piece of bar stock of the material when exposed to the action of pure oxygen at 1650 deg. Fahr. for 8 hours shows a layer of protecting material less than one-thousandth inch thick. It is claimed that even under conditions of artificial leakage Silcrome retains a characteristic bronze color and does not show signs of oxidation.



Thompson Silcrome valves. Manufactured in one piece, of silicon-chromium alloy

A quality which is developed in this material and which, the makers state, has been of particular value in reducing wear on the guide, is that in service the stem develops a highly polished, non-porous surface layer. The thickness of this layer is inappreciable and when examined under the microscope a structure similar to that of martensite is revealed. It is claimed that this surface has less tendency to wear away the bearing surface of the cast iron guide than hardened steel, and also tends to prevent sticking. This surface hardening, of course, is of advantage also in preventing wear on the bottom of the stem.

Permits Use of Lighter Springs

According to the Steel Products Co., Thompson Silcrome cannot be air-hardened under 1750 deg. Fahr., and does not change its grain size up to 2000 deg. Fahr., hence the circumferential cracks, which with some materials start on the exposed portion of the stem above the guide and frequently cause fatigue fracture, are eliminated. As far as seating qualities are concerned, the same surface-hardening process which takes place on the stem and at the end thereof also affects the seat. From the standpoint of lightness, a saving of 13 to 2½ per cent is claimed, as compared with other materials used for valves. This would permit of the use of lighter springs and result in a general reduction of inertia strains throughout the valve mechanism.

The valves are manufactured in one piece by the Steel Products Co. Aside from the resulting decreased cost of production, this has the advantage that it permits of finishing the junction between the steam and head to a smooth curve, providing the best passage for the gases. This is impossible with cast iron, which cannot be turned down to a feather edge without breaking.

The chromium content of Thompson Silcrome is near the stainless range, but unlike some of the high chromium steels, Silcrome is hard enough to meet the requirements for valve material. The physical qualities as given by the manufacturers are as follows: In the annealed state Silcrome has a scleroscope hardness of 40-43 and a Brinell hardness of 265-275. It will not air-harden below 1750 deg. Fahr. Its natural hardness, which is of the same order as that of the cast iron of the valve seat, is retained under extreme heat conditions. The tensile strength is approximately 180,000 lb. per sq. in. and the elastic limit when cold is 130,000 lb. per sq. in. The reduction of area is 27 per cent and the heat conductivity apparently the same as that of normal steels. Its coefficient of expansion is 0.000007033 per deg. Fahr.

Dealer Education Major Merchandising Problem Before Manufacturers

Little effective, constructive work accomplished so far. Factory traveling men needed who can help dealer solve administrative, as well as selling, problems. Distributors must help instead of patronize. Trade-in allowances often due to car builder's policy.

By James Dalton

"WHAT are you doing to help your dealers become real merchandisers?"

If this question were asked the motor vehicle manufacturers of the country, few of the answers would show much really constructive efforts up to this time. Some companies are making earnest efforts to build up the caliber and morale of their sales organizations, but comparatively little effective work has been accomplished so far.

The great majority of dealers are left to shift for themselves. A small minority are abundantly able to do it but the rest are just "muddling through." They have had little merchandising education, they have only the most rudimentary knowledge of financing, and they are not familiar with cost systems. A good many seem to think you are talking about the roof when you refer to "overhead."

Competition for capable dealers is exceedingly keen and will become increasingly so as demand for dealers becomes more insistent and supply remains practically stationary. The big production companies are showing a strong tendency to expand their dealer forces, and this is making serious inroads on the staffs of a good many of the smaller concerns. Every company wants efficient dealers, but those which build lines easy to sell have the least difficulty in getting them. It would seem, therefore, that those with smaller production should be the ones to pioneer in dealer education.

As the situation stands to-day the chief point of contact between the factory and the dealer is the traveling sales representative. Theoretically he helps the man on the sales firing line solve his problems and promote his business, but practically he does little except try to sell the dealer more cars than he wants. His chief object in life seems to be to make the dealer in Oscaloosa absorb the quota assigned to him by the factory sales manager. It may mean bankruptcy to the dealer to do it, because he will have to do ruinous trading, but if the factory gets the money the average traveler figures it will not be difficult to get another dealer for that little town in the sticks.

IT is a serious question whether this constant effort on the part of the big production companies to force sales, and thereby permit of capacity output, will be good business in the long run. The man who sells the cars contends that no factory can continue prosperous unless the dealers are prosperous and a lot of substantial dealers are going broke. In almost every case they attribute their failure to their losses on hectic trading undertaken to meet the insistent demands of the factory to take more cars. A good many of the new cars they have disposed of have been only half sold, and a car half sold is worse than none. A considerable number have been bought on time by persons who couldn't afford them and will find their way into the glutted used car market.

The used car is a very real and serious problem and it is high time the factories did something constructive to solve it. They cannot be held entirely responsible if the dealer pays twice as much as it is worth for a used car, but a good share of the blame is theirs if they have been hounding the dealer to take more cars and threatening to transfer his franchise if he failed to do so. Trading is an individual problem for every dealer, but he never can solve it so long as he is straining every nerve to make sales, and the only way he can make them is to give a more liberal trading allowance than his neighbors.

THE answer to the used car question and most of the other problems with which the average dealer is afflicted is horse sense and knowledge of the primary elements of merchandising. Comparatively few dealers ever have been engaged in any other line of merchandising. They have "picked up" most of what they know.

If they are to be successful merchants they must learn sound merchandising. Granting that this is true, who is going to teach them? The logical source of this information would seem to be the factory. The logical method of imparting it would be through the traveler. The chief difficulty is that the traveler doesn't know. He is primarily a salesman and he knows comparatively little of dealer problems.

It would appear, therefore, that one of the first steps to take would be to give the traveler some schooling in the problems of merchandising from the point of view of the retailer. This would require the expenditure of considerable effort and money, but the results would be worth the cost.

If the dealer could look to the traveler for advice and assistance his visits would be as welcome as those of an angel, even if he did try to sell cars at wholesale. His sales efforts would be more or less incidental, for as the dealer learned sound business principles and methods his sales would increase. He would look to the traveler for something more than a "bawling out" because he had failed to get rid of enough cars. His friendship for the

factory would increase and there would be developed an invaluable spirit of co-operation.

Assuming that the traveler provides the most practical machinery for extending help to the dealer, the next question is how to get the right type of men as traveling sales representatives and how to educate them as to dealer needs.

FACTORY sales managers do not hesitate to admit that they have much difficulty in obtaining men of the right type, especially now that traveling forces are being rapidly expanded. They seem to feel that the men who could do the work most efficiently can make more money doing something else. There seems to be considerable difference of opinion as to whether travelers should be on a straight salary basis, salary and commission, or commission entirely. That, obviously, is something each factory must determine for itself and each must figure the personnel question out for itself.

There seems to be a strong swing of sentiment in the factories toward retail selling schools in some form or other, not only to train travelers but to educate dealers and distributors. Ideas along this line are not in any sense uniform and they appear to be more or less nebulous.

One outstanding company in the middle price field contemplates establishment of what it will call a "sales planning department." The planning will relate to sales at retail and it will be designed primarily to help dealers. The first step, however, will be to familiarize travelers with dealer problems and the best means of solving them. For travelers an intensive course of study will be given at the factory, and for the dealers it will be largely a correspondence course with occasional "lectures" by the travelers when they are qualified to give them.

It is planned to obtain from many sources the data which will be used in what might be called the text books. The subjects considered will include various phases of selling, such as the correct method of keeping prospect files; cost accounting and finances; service, used cars, etc.

All the information gathered on any of these subjects will be tabulated and analyzed and an attempt made to arrive at some standard solution of common problems which are likely to come up in the experience of any dealer. Data will be collected from a variety of sources but chiefly from the dealers themselves. All of them may be asked, for example, to explain their service system, including the volume and profits. These reports will be analyzed to determine whether they have any points in common, and a foundation thus will be laid upon which to assemble an answer which will present a composite picture of the best service system.

Naturally, it would require considerable time to assemble all the data needed on even the common problems alone and revision would be necessary as better methods were worked out; but travelers already on the staff could study the information as it was accumulated and put themselves almost immediately into a position to answer intelligently some of the questions asked by dealers. When all the problems common to dealers were worked out, new men added to the staff could assimilate the course before they took the road.

This company does not propose to wait until it has answers to several questions before it begins to pass the information on to the dealers and it does not propose to confine its educational efforts to the work done by travelers. The preliminary plans call for the preparation of helpful bulletins at frequent intervals. One of them might discuss, for instance, the advantages of the flat rate system for service, another the various plans evolved for coping with trading evils, and still another might be devoted to prospect files.

It is believed that if the dealer studied these bulletins carefully he would derive from them much information which would help him in his own business. The practical application could be worked out for him by the traveler who covered his territory.

To make the plan effective some system of checking would be necessary to keep track of the amount of time devoted to the work by the dealer and the traveler. One might serve as a check against the other. A traveler could soon determine whether a dealer was getting as much as he should out of the factory effort, and a dealer who was honestly trying to help himself would have a legitimate cause for complaint if the traveler covering his territory did not give him a reasonable amount of assistance.

In all the plans contemplated for dealer education, the distributer figures prominently. The factories feel, and with reason, that a man who is a good enough merchandiser to justify his retention as a wholesaler should be able to give practical assistance to the dealers under his jurisdiction in getting around the difficulties which confront them. Here again, however, the assumption is theoretical and does not always work out in practice. There are a good many distributers who seem perfectly content to take their discount of the cars sold by the dealers under them and who make small effort to help those dealers increase their sales.

Factories feel that some distributers do not get around their territory frequently enough, that they do not give enough attention to scientific sales analyses, that they do not scrutinuize closely enough the trading methods and service systems of their dealers. It undoubtedly is true that a distributer of the right type can be of very great assistance to his dealers.

ONE important point to be borne in mind is that if the distributer is to be of any practical assistance to the dealer he must assume the proper attitude. He cannot be helpful if he is condescending and patronizing. He must make the dealer feel that he wants to be a real friend, and he must be able to make the dealer talk frankly of the problems which are troubling him.

The distributer who drives up to the dealer's store with

MOST manufacturers agree upon the necessity of "educating the dealer." Few successful experiments in dealer education have been accomplished, however, thus far.

Factory schools for traveling men are contemplated by certain companies. They feel that the factory sales representative is the chief contact point with the dealer organization and that he must be equipped to assist the dealer in solving administrative and selling problems. Few traveling men are capable of giving such aid at the present time. Too many of them are salesmen without much knowledge of administrative matters.

This article points out the chief difficulties being met in trying to educate the dealer and gives some constructive suggestions for meeting them.

a 6-in. cigar in the corner of his mouth, and then strides in haughtily with his forefingers caught in the arm holes of his vest and his chest thrown out, is not going to get very far in winning the dealer's confidence. The dealer is more likely to say to himself:

"Oh, ———! What's the use trying to get any advice out of this bird? He would just laugh at me anyway if I told him about that leak in the service station or that ornery cuss down the row who's out-trading me."

Education Through Traveler and Distributor

It probably is safe to say that all the factory plans under consideration for the training and education of dealers are based on the traveler and the distributer. If they are to be successful, as has been stated before, the actual work must be done by the right type of man. Capturing enough of them to go 'round will be the big job.

At least one company contemplates a series of actual class room conferences at which the dealers in given territories will be brought together for instruction by experts in their common problems. The man who is formulating this plan knows the dealer's problems from the ground up. When asked the other day what was the greatest thing a manufacturer could do to help his dealers, he replied:

"Establish retail selling schools."

There probably is not a factory in the country which is entirely satisfied with the work being done by its travelers. Most of them are frankly uncertain about what to do to remedy the situation. They are convinced their traveling sales representatives are not giving the dealer organizations as much practical help as they should. Some travelers are honestly trying but many of them seem indifferent. The ones who have the knowledge which enables them to give sound advice are jewels.

If careful study is given to the results achieved by two travelers of equal selling ability, one of whom is able to give practical aid to the dealer and one of whom isn't, it will be found that sales will run materially higher in the territory covered by the real dealer helper unless it has been hit by an earthquake, devastated by fire or struck by a business calamity.

Working forward from this accepted fact, it is not difficult to visualize the importance of educating travelers so they will be able to educate dealers. The same is almost as true of distributers.

Standard 28-Passenger Bus Placed on Market

A NEW bus known as model A-K has been placed on the market by the Standard Motor Truck Company. It seats 28 passengers exclusive of the operator. The wheelbase is 190 in. and Sewell cushion wheels are fitted 36 x 5 in. front and 36 x 5 in. dual in the rear. Regular equipment calls for semi-pneumatic tires.

Standard units are used for the assembly. The engine is a Continental model L-4. Other units include an Eisemann magneto, model G-4; Stromberg carbureter, Brown-Lipe clutch and transmission, Spicer joints, Timken bus type front and rear axles and Gemmer steering gear. A 7-in. frame is used with a kick-up over the rear axle.

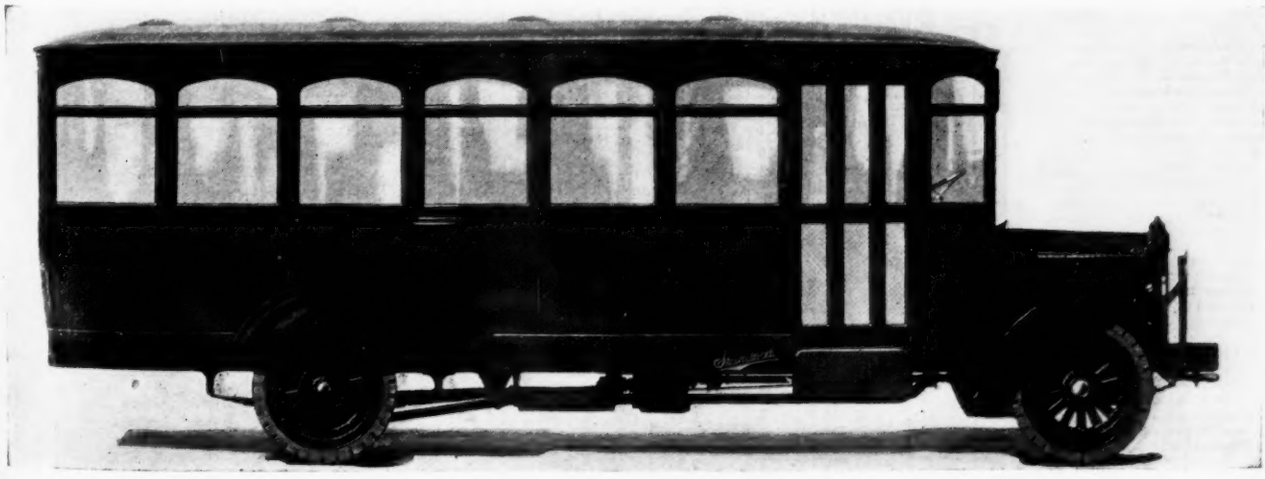
Springs are semi-elliptic all around. Front springs are 46 in. long and 3 in. wide; rear 58 in. long and 3 in. wide.

The selective-sliding, gear type transmission is located amidship supported in the chassis at three points to two cross members.

The bus is a one-man operated type with entrance forward so that passengers must pass by the operator. Equipment includes an exhaust heating system, buzzer passenger signaling system and lighting equipment.

THE Bureau of Standards has recently conducted an investigation to determine the cause of excessive wear of exhaust valve seats on engines of a certain type. After numerous experiments it was found that the difficulty was due to the high temperature attained by the metal.

When the valve and seat were heated to a high temperature by a reducing flame, the wear of the seats was sufficiently rapid to amply explain the difficulty. After this probable cause of the trouble was determined. it was found that the cooling of the valve seats which showed the greatest wear was somewhat defective, thus permitting them to attain an excessive temperature under conditions which often occur in practice.



Standard model A-K bus has well known units in assembly. Wheelbase is 190 in. and 36 x 5 in. tires are used all around

American Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS						GASOLINE TRUCKS						PARTS
	Up to $800		$800 to $2000		$2000 and over		Up to 1 ton incl.		Over 1 to 2½ tons		Over 2½ tons		
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value
Europe													
Austria													
Azores and Madeira Islands	1	$414											$725
Belgium	334	89,377	11	$14.031			460	$106,557					34,314
Bulgaria													
Czechoslovakia	4	1,285											350
Denmark	19	10,080	7	9,149	1	$2,689			1	$1,350			45,564
Finland													320
France	2	1,010	8	9,502	1	3,500							386,738
Germany			1	1,000	2	5,358							50
Gibraltar			3	2,971									45
Greece	3	1,070	3	2,700									1,164
Hungary	3	1,243											
Iceland and Faroe Islands													489
Italy	4	2,539	1	915									6,195
Malta, Gozo and Cyprus Islands	3	1,741	2	1,821			2	808					722
Netherlands	38	21,499	36	39,152	2	5,033							13,077
Norway	5	3,135	23	20,899									8,807
Poland and Danzig													
Portugal	1	758	3	4,416									5,970
Russia in Europe							10	5,700					20
Spain	124	53,057	111	131,304	15	36,978	20	4,687					84,921
Sweden	44	32,814	44	49,054	1	2,378			6	7,850			22,322
Switzerland	7	4,184	5	7,938	2	5,355							1,800
Turkey in Europe			2	2,759									1,931
Ukraine													
England	454	223,457	48	54,853	4	10,609			57	42,315			267,851
Scotland			2	1,788									771
Ireland			1	900									9,393
Yugoslavia, Albania, etc.													936
North and South America													
Bermuda													23
British Honduras													443
Canada	184	103,342	328	374,838	60	162,340	47	35,310	48	66,154	11	$27,198	1,359,414
Costa Rica													540
Guatemala													1,828
Honduras			2	3,372							1	3,800	1,064
Nicaragua													322
Panama	10	6,334	5	6,965									3,321
Salvador	1	335	6	7,704	1	3,500							1,657
Mexico	587	240,731	197	212,059	8	22,686	41	15,188	9	13,347	5	14,558	81,042
Newfoundland and Labrador													947
Barbados	2	828											1,881
Jamaica	20	9,921	9	10,223			6	2,424					2,629
Trinidad and Tobago	1	735					3	2,857	1	1,493			6,429
Other British West Indies	12	5,637	2	3,400			1	344			1	8,000	1,970
Cuba	159	53,438	37	46,152	13	36,988	58	15,056	4	3,157			80,861
Dominican Republic	23	8,333							2	4,248			9,793
Dutch West Indies	2	848	1	1,207									567
French West Indies	1	414											2,183
Haiti	7	3,110					3	1,212	2	2,528			1,831
United States													
Virgin Islands of U. S.													287
Argentina	118	83,049	67	76,169	5	17,911	1	1,129			1	3,600	343,539
Bolivia	2	708					6	2,408					2,979
Brazil	180	72,995	109	115,363	7	16,052							44,984
Chile	10	3,040	7	8,538			24	8,416	2	4,248			11,132
Colombia	12	4,887	5	5,521			2	1,865					6,969
Ecuador													428
British Guiana	5	2,370					1	358					1,525
Dutch Guiana	6	3,020											113
French Guiana													121
Paraguay													
Peru	13	6,910	2	1,668									6,404
Uruguay			6	6,639	2	5,356	2	993					3,480
Venezuela	34	16,990	23	28,190	3	10,472	5	2,020					5,971
Asia													
Aden									1	1,400			12
Armenia and Kurdistan													
Ceylon	12	7,608							2	2,782			2,121
China	2	500	16	17,821	2	5,017			1	2,810			2,683
Chosen	2	1,013											561
Kwantung	52	10,500			1	2,709							214
British India	99	64,647	18	17,701	1	2,146			7	8,415			32,240
Straits Settlements	19	11,023	7	8,074									7,284
Other British East Indies													99
Java and Madura	29	22,608	16	16,145									7,881
Other Dutch East Indies			1	1,283									962
French Indo China													65
Hejaz, Arabia and Mesopotamia													1,091
Hongkong			15	15,453	4	13,506							2,408
Japan	91	36,527	10	12,858			157	63,746	85	46,386	11	46,575	47,293
Palestine and Syria	168	74,915	21	25,598					1	1,000			8,595
Philippine Islands	11	7,850	1	950	1	2,500							7,043
Greece in Asia													38
Turkey in Asia													20
Siam	4	2,040	4	3,908									133
Oceania													
Australia	591	354,962	426	463,161	16	43,653	91	69,907	26	30,690			94,409
New Zealand	132	95,291	68	77,919	1	2,167	4	5,931	20	22,748	3	9,814	27,723
Other British Oceania													451
French Oceania	1	525	1	1,525									1,060
Other Oceania													
Africa													
Belgian Congo	6	1,958					1	800					34,130
British West Africa			2	2,284			4	4,460	5	5,712			6,473
British South Africa	117	85,638	112	110,970			3	3,645	1	1,080	3	13,260	38,628
British East Africa	8	4,655	7	8,044									5,602
Canary Islands	11	5,136	6	5,818			11	4,724					5,385
Algeria and Tunis	1	358					2	728					1,579
Other French Africa	2	627					6	2,424					1,981
Egypt	29	11,946	3	2,965									5,070
Morocco	30	13,274					6	2,424					1,498
Portuguese East Africa													100
Other Portuguese Africa													220
Spanish Africa			6	8,117					1	1,080			560
Total	3,852	$1,889,239	1,857	$2,063,754	153	$418,903	977	$366,121	282	$270,893	36	$126,805	$3,226,764

September, 1922 | Canadian Exports

ELECTRIC PASSENGER CARS AND TRUCKS		TIRES						PASSENGER CARS		MOTOR TRUCKS		PARTS	COUNTRIES
		Casings		Solid		Inner							
No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
													Europe
		100	$1,587			100	$100						Austria
													Azores and Madeira Islands
		861	13,633			530	1,048	12	$9,717				Belgium
		25	180			114	255						Bulgaria
													Czechoslovakia
		656	7,523	38	$898	325	633	7	7,472			$119	Denmark
		57	1,467	8	178	42	100						Finland
		5,465	52,552			50	85						France
		4	106			602	1,202						Germany
		14	351										Gibraltar
		240	3,323	16	720	140	186					181	Greece
													Hungary
		117	1,517			110	159						Iceland and Faroe Islands
		191	2,979			60	111	2	2,272				Italy
		98	1,036			168	347	2	945			32	Malta, Gozo and Cyprus Islands
		768	14,931	6	128	1,074	2,283	8	3,438			98	Netherlands
		436	8,368	27	1,122	517	1,069	4	3,945			283	Norway
		262	4,152			280	509						Poland and Danzig
		931	12,472	94	2,795	424	783						Portugal
								1	1,068				Russia in Europe
		898	18,575	142	3,450	1,586	3,737	38	40,251			395	Spain
		2,670	41,860	31	1,457	2,409	5,523	21	17,222			394	Sweden
		204	2,220			140	231	4	3,908			52	Switzerland
		365	3,383			130	168					198	Turkey in Europe
						13,365	21,235						Ukraine
		24,945	208,139	591	11,696	35	33	597	471,348	3	$5,000	72,564	England
		191	1,811			575	786						Scotland
		595	5,080			278	687						Ireland
		304	6,772										Yugoslavia, Albania, etc.
													North and South America
													Bermuda
													British Honduras
1	$2,500	2,564	39,028	294	10,499	2,864	5,824						Canada
		24	549	36	371	34	71	4	3,475				Costa Rica
		187	3,919			104	256	1	1,160			50	Guatemala
		71	2,006	16	728	80	158					30	Honduras
		35	686			52	134						Nicaragua
		358	5,948	30	788	558	995						Panama
		32	868	2	84	57	128						Salvador
		6,474	76,683	146	3,751	5,237	11,071	9	9,457				Mexico
		97	1,555			258	430					265	Newfoundland and Labrador
		153	2,017	2	63	47	99						Barbados
		553	13,024	45	1,502	412	386						Jamaica
		424	4,839	6	327	85	226						Trinidad and Tobago
		187	1,613			185	332	7	5,335			369	Other British West Indies
		11,634	120,580	1,112	28,063	7,792	12,251	5	5,060				Cuba
		988	13,866	102	1,654	1,284	3,011						Dominican Republic
		101	1,093			119	223						Dutch West Indies
		342	3,666	4	57	234	373						French West Indies
		240	3,083			340	557						Haiti
								14	5,520	1	314	20,478	United States
		51	587			182	365						Virgin Islands of U. S.
		7,581	88,591	79	1,638	7,909	11,264	97	85,462			1,394	Argentina
		236	4,974			172	404						Bolivia
		6,083	59,797	84	2,134	4,282	5,725	32	25,211			640	Brazil
		1,955	30,271			1,556	3,229					66	Chile
		493	7,442	22	534	536	1,131	5	4,088			175	Colombia
		94	1,520			38	96						Ecuador
		315	3,363			225	368	4	2,690				British Guiana
		20	284			20	73						Dutch Guiana
		4	77			2	3						French Guiana
		130	1,092										Paraguay
		824	12,797	43	1,235	512	1,043						Peru
		252	3,710			580	747	13	6,599				Uruguay
		963	11,815	18	355	1,545	2,745	8	5,265				Venezuela
													Asia
		250	2,164			165	213	2	868			33	Aden
													Armenia and Kurdistan
								33	12,468			150	Ceylon
		140	2,076			235	357	5	5,468			444	China
													Chosen
		1	30										Kwantung
		363	4,530	86	1,977	278	488	216	91,393			5,768	British India
		155	1,819			115	206	37	12,545				Straits Settlements
						100	160						Other British East Indies
		103	11,388	132	4,146	350	572						Java and Madura
		169	1,543					7	4,390			1,995	Other Dutch East Indies
													French Indo China
		270	2,598			220	412						Hejaz, Arabia and Mesopotamia
								14	15,176				Hongkong
3	4,438	369	5,956	184	7,571	56	163	30	20,120			8	Japan
		2,303	28,414			1,552	3,036	4	3,977				Palestine and Syria
		2,500	35,428	110	2,535	2,957	4,814						Philippine Islands
													Greece in Asia
													Turkey in Asia
		20	199							5	2,170		Siam
													Oceania
		2,680	47,286	337	9,432	1,095	2,207	1,037	495,740	161	75,723	60,508	Australia
		3,736	48,053	168	5,128	1,497	3,286	258	137,228	60	26,040	1,407	New Zealand
		11	129			23	64						Other British Oceania
		23	231	2	43	10	14						French Oceania
		78	779			36	57						Other Oceania
													Africa
													Belgian Congo
		662	4,786			410	928			1	1,372	793	British West Africa
		7,084	77,292	40	1,084	2,100	5,070	390	188,732	38	18,624	19,183	British South Africa
		602	6,903			152	236			5	2,170	72	British East Africa
		791	9,977	52	1,523	461	880	4	1,885				Canary Islands
		43	389										Algeria and Tunis
		124	1,813			96	246						Other French Africa
		744	7,854			351	602	4	2,920			120	Egypt
		104	1,615	47	1,561			3	2,745				Morocco
													Portuguese East Africa
													Other Portuguese Africa
		270	2,748	34	1,670	235	482						Spanish Africa
4	$6,938	107,457	$1,241,360	4,186	$112,897	72,858	$129,481	2,939	$1,716,563	274	$131,413	$188,265	

More Views on Automotive Electric Equipment

Proposed Standards for Electrical Units Continue to Bring Forth Comments from Prominent Men of the Industry

Editor, AUTOMOTIVE INDUSTRIES:

There is no question but that the standardization of electric starting, lighting and ignition systems, suggested in the tentative program outlined by the Automotive Electric Association on Sept. 1, account of which was published in a recent issue of AUTOMOTIVE INDUSTRIES, offers great opportunity for the accomplishment of much good.

It cannot be expected that a finished plan can be laid down in the beginning but, with a series of generators and starting motors provided for known conditions as a nucleus, a careful analysis of the demand for further capacities should serve as a guide and if conservatively followed will soon result in a complete and successful specification covering the entire field.

No doubt, the individual will at times demand special results of unusual character but, with a series of equipments of varying size and speed providing a range of carefully selected performances, it should be possible to choose a combination capable at least of approximating the most exacting requirements.

After all, good design is largely a matter of compromise and the advantages of standardization are so great and of such monetary value as to justify a slight modification of the ideal, resulting in the product of a given industry being fundamentally uniform in proportions and construction effecting interchangeability and general results obtained.

If the policy back of a standardization movement is sound, as in this case, it should receive the complete support of everyone interested. The manufacturers of electric starting, lighting and ignition systems are obviously in the best position to decide what parts of this equipment can be made uniform and to outline a specification of performance which will meet general requirements in the broadest sense.

Manufacturer's Cooperation Needed

The members of the Automotive Electric Association will know the importance of bringing the motor car manufacturer or user of this apparatus into the controversy to the fullest extent. It is one thing to set up a standard and another thing to make practical application of it. The manufacturer appreciates that the setting up of a standard does not mean an attempt to influence him to the extent of an immediate, inconvenient and expensive change of policy, but that a standard is set as a desirable possibility to be adopted when the opportunity next presents itself.

If my understanding is correct, that the Society of Automotive Engineers is co-operating with the Automotive Electric Association in this work and if it is the intention to use the machinery of the S. A. E. for recording and putting the standards before the trade, it is as it should be, for the S. A. E. has had many years of experience and has perfected the channels through which to handle this sort of work. It would be too bad, in my estimation, to duplicate where coordination will further strengthen an already existing medium of recognized merit and accelerate the time when this work will be of practical value.

The pioneer work of establishing mounting dimensions for the electric units in question has been done by the S. A. E. during the past few years, so it is the natural thing to follow this movement already started, but under the guidance of the actual manufacturer.

Emphasize Value of Standardization

A. D. T. Libby, president of the Automotive Electric Association and formerly chairman of the Electrical Equipment Division of the S. A. E., states the case most clearly in that concerted and systematic effort should be exerted in the direction of greater appreciation in influential quarters of the great general advantage of highly standardized products. In the intelligent conduct of business, so far as standardization is concerned, the engineer, production department, the executive and the purchasing agent must work together in determining those policies which alone can result in proper economy and in adequate service to the public.

The present S. A. E. standards and recommended practice relating to the installation of electric motors and generators on gasoline cars are:

Generator flange-mounting, for gear or chain drive.
Generator bracket-mounting.
Starting-motor flange-mounting, and
Starting-motor sleeve-mounting, for outboard installations.

If there is any question as to the practicability of these standards as they exist, they should be modified or discontinued. If they are inadequate, they should be expanded but, surely, there is a great need for uniformity of electrical apparatus from the standpoint of performance, installation and service.

The development of this work could not be in better hands and, with the co-operation of the S. A. E. and the enthusiastic support of the industry back of it, it is

bound to react substantially to the advantage of the manufacturers and users of automotive vehicles.

G. W. DUNHAM, Savage Arms Corp.

Editor, AUTOMOTIVE INDUSTRIES:

While I am not thoroughly familiar with many of the details of standardization, yet I am heartily in sympathy with the general proposition for the reason that standardization means cheaper but better goods.

The new standards proposed by the Standardization Committee of the Automotive Electric Association would seem to me to be along the proper line as they would tend to put competition between the manufacturers of electrical equipment on a uniform basis.

I understand that many of the S. A. E. mounting dimensions for electrical generators and motors are not widely used. This is unfortunate and it seems to me there ought to be a remedy and no doubt the Standards Committee of the A. E. A., in co-operation with the S. A. E. and car and engine builders, with the support of journals like your own, will finally arrive at a solution of the problems involved.

M. W. BARTLETT, Splitdorf Electrical Co.

Danger in Standardization

Editor, AUTOMOTIVE INDUSTRIES:

The proposed standardization program for electric generators, as I see it, will be quite a difficult task.

As far as generator characteristics are concerned, what is good for one generator should apply to all; however, they do not and I do not believe six styles will cover these variations.

Regarding mountings, just as long as automotive engineering is active, different locations for generators will call for different designs, not only for mounting but for other dimensions as well. I might add here that I personally feel that too much standardization is a bad thing because there is a tendency on the part of some designers to use some piece of standard apparatus, actually sacrificing good design, cost, etc., to avoid a slight tool cost.

To my way of thinking, standardization should apply to "standard parts," not to units that are being developed every day. Starting, lighting and ignition have the same field for future development as the gasoline engine; this cannot be said of the lock washer. Hence, my understanding of a standard part.

B. H. ANIBAL, Peerless Motor Car Co.

Another View on Electrical Standards

Editor, AUTOMOTIVE INDUSTRIES:

With regard to standardization of starting and lighting equipment, we have designed all our new models to take the standard S. A. E. flange type mountings for both starter and motor generator. We have also made provision for starter on both sides of motor.

We supply four-cylinder engines to the truck, tractor and industrial fields and have discouraged the use of generators and starters while they were in the development stage. We still discourage the use of these units except where they are absolutely necessary and of undeniable value in service. We do this in the interest of simplicity and maintenance.

Our old models were not originally designed to take starter and generator, and while we were working out of them into the new models it took practically 75 per cent of our chief draftsman's time to work out suitable applications of the many varieties, designs, models and makes of starters which have appeared in the market and been specified by our customers.

The great lack of starter and generator standards and dimensions has been the cause of so much inconvenience and loss to us that we refused to apply some models to our motors and discouraged the applications of many models in sheer self-defense.

We feel that the standards proposed by the Automotive Electric Association are excellent and adequate for the large part of the motor car and truck field.

We have a call for a larger generator to handle 10-15 (60-100) watt lamps so that contractors can work at night. This demand, which is limited at this time, will grow, but is not great enough to be taken into account in this standards work.

We have provided a one and one-half engine speed connection for all our generators, having found that our service calls for considerable slow-speed work.

We feel very gratified to learn of the efforts you are making and can assure you it will result in an immense value to you. In behalf of our organization, we wish to thank you for your efforts and to assure the Automotive Electric Association and the Standards Division of the Society of Automotive Engineers of our hearty approval and co-operation.

H. L. HORNING, Waukesha Motor Co.

Improvements Suggested

Editor, AUTOMOTIVE INDUSTRIES:

Regarding the subject of standardization of electric generators, we beg to offer the following on proposed standard No. 3:

We are of the opinion that the proposed generator speed is satisfactory, but the output is too high for the average truck and when used for bus service some arrangement should be made to cut the generator output during the daylight hours in order to protect the battery.

Its maximum amperage of 15 is in excess of the requirements of the average truck. Eight to 10 amperes is sufficient inasmuch as most of the running is during the day and a small amount of current is required for starting and lighting.

Electrical equipment for trucks necessitates rugged generator construction and, due to continuous hard service requirements, we would suggest conservative rating for this class of equipment.

M. E. TOEPEL, Mack Trucks, Inc.

Relation Between Torque and B.M.E.P.

IT is well known that for any given engine one and the same curve may be used to represent the torque and the brake mean effective pressure, if two scales are provided, and it is therefore obvious that there must be some simple relation between these two factors. This relation, however, depends upon the piston displacement of the engine. It is given by the equation:

$$\frac{T}{D} = \frac{\text{b.m.e.p.}}{150.8}$$

where T is the torque in lb.-ft.;
D, the piston displacement in cu. in.;
b.m.e.p., the brake mean effective pressure in lb. per sq. in.

Editor's Note: The above equation was worked out at the request of a correspondent.

Automotive Industries
November 16, 1922

Cut Selling Costs by Closer Study of Methods

Competition tends to raise prices by increasing expense of marketing products. Jobbers and dealers called upon to store large quantities of material. Turnover not rapid enough. Advertising should be directed to specific group.

By Harry Tipper

THE effect of competition upon the price to be charged to the user, or consumer, has not been sufficiently studied in connection with marketing plans. The economist and business man have been content to believe that greater competition will bring prices down in the struggle to secure a large share of the market and that this effect would lead to a greater efficiency.

Despite that tendency, the cost of competition operates to increase prices, because of its large additions to the cost of marketing and distribution, and the relation these bear to the total cost. This is particularly true of accessories, smaller parts, etc., and the thousand and one items sold through jobbers and dealers to the individual car owner.

The manufacturing cost of an article, raw material, labor and capital, used in getting the goods to the factory door, packed and ready for shipment, may be $1. The user of the article pays $4. What does the $3 represent? It consists of transportation, handling, warehousing, stocking, selling, advertising, delivering costs and profits,—as the production capacity increases, and more and more manufacturers come into the field intent on getting a share of the business.

Each concern develops activities calculated to give to its products widespread distribution as far reaching as can be developed. Each attempts, by all possible methods, to secure an outlet through every jobber and every retailer. At the same time the increasing flood of product adds to the number of jobbers so that more jobbers are similarly competing for the business of the retailer, by all methods which promise results.

Retailing Costs Mount

Similarly, the growth in the business itself attracts men into the field of retailing. These retailers are competing for the trade of the individual consumer. The manufacturer begins to complain of the cost of distributing his goods. At the same time the new concern —entering the field—talks emphatically of the difficulty of getting a bearing.

Many times new concerns will attempt new methods of getting the goods distributed in order to escape the difficulties imposed in the attempt to do something through the regular channels. This increasing competition has the effect of adding to the service the manufacturer will render his customer so that he may get or insure his share of the market. For instance, several concerns have furnished men to go out with the jobber's salesmen, make canvass on the proposition they handle and study conditions. This is done for no other purpose than to insure and foster sales. Branch stores, special retail agencies, additional sales promotion work, and other items are considered as to their effect upon the marketing of the product. Advertising, sales promotion, sales and other efforts directed at marketing are used more voluminously for the same reasons.

Cost of Getting Orders Eats Profits

The jobber is pressed to add more and more articles to his catalog, to his stock, and to the work of his sales force. The retailer is implored to stock a larger variety and the user is importuned in a thousand ways to spend his small purchasing power through a multitude of different suggestions. The retailer, in order to offer the maximum possible service to the user, enlarges his stock or changes it as the pressure for his business grows. The jobber carries a larger line in order to give quick service to his retailers and the rate of flow is slower because of the variety of product to be moved.

The purchasing agent of a large jobbing house calculated, from curiosity, the amount of time and money spent by various salesmen in trying to get the order for a small bill of goods he had to buy. He carefully kept count of the salesmen he interviewed on the matter, the number of times they saw him, the telephone calls, the special visits, etc. When he tabulated the results, he was astonished to observe that the actual cost to the various manufacturers together amounted to a sum very close to the actual value of the order.

This was an extreme case, but it serves to illustrate the effect of competition upon market cost. Supposing the replacement market for mirrors represents 3,000,000 for 1922. This number may be increased somewhat by the pressure of selling effort, but not very greatly. All the curves of business development indicate that pressure on the seller does not increase the consumption very rapidly over the general average expected increase. There are fifty-four manufacturers competing for this business and their capacity to produce these mirrors is

10 per cent above the expected market. Under such circumstances, the efforts of all these manufacturers will be intensified very materially. Every possible means will be employed to divert the market from Smith to Jones, because Jones cannot hope to keep his factory at 100 per cent unless he does that very thing. On the other hand, Smith resists any such process and so more money is spent all along the line to get the pressure upon the trade and user.

The greatest additions to cost, however, arise from the slower turnover in the stock of the jobber and dealer from the large selection of articles stored and handled by these concerns. The basement of many a wholesale house is filled with the unsalable commodities that are carried on inventory until the interest on investment has eaten up the whole price. Quick-moving articles in the retail establishment are frequently obliged to carry the burden for articles which remain in stock for long periods.

Not long ago I was able to sit down with a retailer and consider his entire stock requirements. After a thorough inventory, and analysis, we decided that 30 per cent of the stock should be eliminated and ordered as required; 10 per cent more should be cut down 60 per cent and 10 per cent more should be cut down about 30 per cent. This move promised to release about 40 per cent of the capital tied up in stock and increase the turnover of the capital from 3 to 5.5 per year. It also permitted releasing a space large enough to carry the bins and tools for the service station requirements and transferred one man from the supply to the service end, enabling the retailer to do with one less in number of help.

Visible Wastes Can Be Corrected

This case was probably unusual, but there is a great deal of waste resulting from the marketing cost of competition running all through the business. Of course, there is little use in referring to this increasing cost of service competitive pressure in marketing unless suggestions are made as to remedies.

There are some visible wastes which can be mentioned and which may be governed so that they accumulate a considerable total of saving in the aggregate. The most efficient production plant I have been in for years has made a 30 per cent difference in its cost by shaving ¼ of 1 per cent here and ½ of 1 per cent there, through a study of the processes and material.

If the marketing problem is similarly considered there are a number of items which can be successfully changed to a small extent and to the advantage of the entire cost of putting the article into the hands of the user. A good deal can be done by a careful selection of desirable distribution to promote, not on the basis of number of dealers only, but on the basis of the type of dealer and the amount of promotion work to be done. This, of course, is dependent upon a thorough territorial analysis which will enable the manufacturer to determine his operations in each territory in accordance with the possibilities of business. It will also permit him to arrange his marketing plans so that the expense of marketing bears a more exact relation to the possibilities.

In the automotive field there are a good many types of retailers, and these different retailers vary greatly in their capacity to buy accessories and parts in their needs and in the possibilities to develop business from them. Very few manufacturers in this field have a sufficiently large volume to demand a complete distribution through all types of retailers.

The majority of manufacturers of accessories and of similar products are able to take only a small proportion of the business individually, and should select their methods of marketing and advertising so that the pressure of marketing work would be concentrated upon a number of retailers of value to the manufacturer and of a type which will pay him to do business with them.

This may mean that the method of selling used in one territory should not be applied to another territory without modification. It may mean that the methods of advertising should be changed. It is more likely to mean, however, that the material used in the sales work and the advertising work will be changed so that the individual piece of material will more easily represent the value which it should have in order to do efficient work. The manufacturer in his marketing work should approach the question as the engineer has approached production. The engineer knows that each operation must be studied separately and made more efficient by separate consideration. The competition in marketing is more costly than it need be because individual operation has not been examined and there is a tendency for various manufacturers in the same field to use the same methods and the same operations in working out the methods.

For instance, it is quite usual for the various manufacturers dealing with a product to advance practically the same claims in regard to the usefulness of the product in their advertising and selling work. Frequently it would be possible to use the name of any other manufacturer in the group as a signature for the advertisement or as the concern represented by the salesman making the claims.

This is sufficiently true to offer an immediate opportunity for decrease in marketing costs in the more accurate planning of the solicitation work and the advertising copy. All through the only possible decrease in efficiency and reduction in marketing cost will come from the more effective use of the usual methods of marketing and the examination of an individual case or two, and probably the most effectual way to consider the possibilities of increased efficiency in this respect.

The tendency of competition to increase the cost of marketing is too definite and continual a matter to be neglected in the consideration of marketing operations. This tendency to increase marketing costs must be offset by increased marketing efficiency of operations. Most of the men who have considered this subject are looking for some special way by which the marketing costs can be cut through some radical stroke or some unusual consideration. This is not likely to happen. The men who successfully accomplish the marketing of products by increasing the efficiency of their marketing operations will do it by making a slight increase in the value of efficiency of each method and each operation from the sales solicitation to the advertising copy, so that these differences accumulate into a total large enough to be of advantage.

J. R. COLEMAN has been appointed a Subdivision of one to review information obtained by the Society of Automotive Engineers on power takeoff shaft ends and to submit a report to the Truck Division of the Standards Committee.

AUTOMOTIVE INDUSTRIES
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Babson Gives Good Advice

ROGER BABSON is a professional economist. His predictions do not always come true, as evidenced by some of those he has made about the automotive industry, but he is a shrewd observer and a keen student of business practices. He made one statement in an address in New York the other day which has a lot of meat in it for the automotive manufacturer.

"We have applied all that science and human ingenuity have contributed to production," he said, "but we have let distribution look out for itself. The result is that our manufacturing cost has been cut to a fraction of what it was fifty years ago, but the percentage cost of distribution is more than it was fifty years ago. We should begin at once to give more support to the retailer."

Motor vehicle producers can tell very definitely just what their manufacturing costs are, but it is doubtful if many of them have an equally accurate knowledge of their distribution costs. It is a subject they could study with profit to themselves and to their dealers.

The sales machinery which has been established is cumbersome and expensive. The companies which will win in the long swing will be those which are most successful in cutting down their marketing costs.

Charging Free Service to Production

WE have recently received two letters from well-qualified judges expressing the view that a few cents saved in production often results in several dollars cost in service for which the owner of the vehicle usually pays. This is not a new thought. It has often been given expression in these columns. It is generally conceded that low upkeep cost is an exceedingly important factor in influencing sales and that there are no problems before the industry more important than service. If this be true the importance of greater care in production, especially in those factors which directly affect the need for service, cannot be too often or too forcibly expressed.

One of our correspondents now makes the interesting and pertinent suggestion that the large manufacturer charge all free service work directly against the production department. This department might not be overly enthusiastic about this suggestion, but who will deny that it would be just? Certain it is that the more careless the production department becomes the more free service is demanded by the purchaser of its product.

The same observer says "probably the average standard of workmanship to-day on essential things, such as ring fits, accuracy of cylinder bores and so on, is lower than it ever has been." This is a severe indictment, but the observer in question is not accustomed to exaggerate and has had opportunity to judge in the matter through long association with the industry. Whether his view is literally correct or not, it is unquestionably true that many poorly fitted units are daily placed in users' hands. They reflect no credit upon the manufacturers, are certain to give trouble, make dissatisfied users and generally aggravate the service problem, which is none too free from complication already, as numerous makers can testify.

It is the old situation in which an ounce of prevention is worth a pound of cure. Cutting off a dollar in production cost is a commendable thing provided the finished article is as good and as easily serviced as before, but "saving" a dollar at the expense of a dissatisfied user is a mighty poor investment.

Free service costs many makers a tidy sum annually, yet instances have been known in which the same troubles due to faulty design or careless production methods have been allowed to continue indefinitely piling up trouble for the service and sales departments with the production department steadily refusing to mend its ways.

Supplementing Railroad Service with Trucks

IT has long been the contention of the automotive industry that railroads should supplement their service by the use of motor vehicles. The carriers have been slow to grasp this point of view, but they are getting it. Some of them are finding it profitable, especially in the passenger-carrying field.

The electric roads were equally reluctant to admit the advantages of buses, but it is significant that more buses have been sold to traction companies in 1922 than in any other year and perhaps as many as in all other years combined. This field has become a profitable one for truck manufacturers.

Progress almost as great, proportionately, has been made this year by companies making rail cars propelled by automotive power plants.

Evidently steam and electric carriers are coming to see the value of motor vehicles as adjuncts to their normal service.

In view of these facts, the paper read by W. H. Lyford, vice-president and general counsel of the Chicago & Eastern Illinois Railroad, before the National Highway Education Conference, at Washington, assumes added importance.

Probably no man in the country has made a more careful study of the subject, and for that reason his conclusions are especially important. They will be respected by other railroad executives. Briefly stated these conclusions are:

That railroads should use trucks to provide a store door delivery and pick up service for the delivery and collection of freight in congested centers.

That railroads should abandon unprofitable branch lines and serve the territory they traverse with trucks.

Lyford does not contend that this traffic belongs exclusively to the carriers, but merely that they unquestionably will get the business if the service they render is superior to that given by any one else. Even a man in the trucking business himself can scarcely find fault with this point of view.

Lyford points out that the cartage service he proposes already is successfully in operation in other countries and he is firmly convinced that it can be adopted with profit in the United States.

In all probability the proposals made by this long headed and broad visioned railroad man eventually will be made effective, but it will take time. The cumulative effect will be little short of revolutionary.

One result will be a tremendous saving to the carriers in terminal expenses. They will not need huge freight depots and much of their equipment which is now used for storage, by the payment of demurrage charges, will be released for more profitable and more essential service. A new system of warehousing would spring up immediately, for Lyford contends that all the roads would need in the way of terminal storage facilities would be long covered sheds to protect freight from the elements.

Collection and delivery of freight would be expedited by the use of trucks and shippers would be better served. In this work he believes the railroads should pool their interests. Operating independently they might find it unprofitable but working together they could make money on it.

Lyford also admits that railroads would not suffer seriously by surrendering to trucks short haul l.c.l. freight. He probably feels, however, that this work also might be undertaken profitably by the railroads themselves. It would release for other work much of the 20 per cent of their equipment which is now being used to return only 4 per cent of their total revenue.

Automotive executives should find much of interest to them in the abstract of Lyford's address printed in AUTOMOTIVE INDUSTRIES of Nov. 2. Really extended use of motor vehicles by the railroads to supplement their service may be some distance in the future, but it is surely coming.

The revolutionizing of this phase of transportation will bring new and constantly expanding markets for the wide-awake motor vehicle manufacturers. They are the ones who logically should provide the equipment. They can get the bulk of the business if they go after it and if they keep step with the most advanced thought in the way of design, quality and price. If they don't, they are likely to lose a good share of it to companies now manufacturing railroad rolling stock and who are more thoroughly familiar with the carriers' peculiar point of view.

Factories Hampered By Lack of Bodies

Many Plants Have Enough Orders to Maintain High Production Programs

NEW YORK, Nov. 13—Although the major automobile producing plants have entered November with sufficient orders to justify production close to the high schedules of the earlier months of the year they are being seriously hampered by inability to get enough bodies for the enclosed type of car, around which output now centers. Because of this scarcity some makers, with orders far in advance, have found it necessary to curtail their program sharply. This situation probably will not recur once the additional body plants now under construction are in operation, but for the present it is the greatest obstacle to sustained production.

The demand for closed cars far exceeded the anticipations of the makers and found most of the body builders not equipped to meet it. Orders are being taken care of as rapidly as the equipment permits, with shipments regulated solely by the available transportation facilities.

Transportation More Difficult

The transportation situation has grown more serious, enforcing the greater use of driveaways to deliver finished cars. This, however, has not brought relief to dealers at a distance from producing centers. Not only are freight cars scarce but congestion is great and locomotive power insufficient. A further aggravation is that fewer boats are available for shipments as the cold weather sweeps over the lake district.

The problem of the industry continues to revolve about the question of getting material and delivering cars and not so much around the question of sales. It is to be expected, however, that sales will drop off this month but not to the level of last November when output was down to a figure approximately 120,000. The fact that November is a short month and includes a holiday will be a further reason for failure to reach the mark attained in October.

Business with parts makers is good, with indications of a continuance of satisfactory conditions for months to come. Collections show no falling off from previous weeks.

Recognition given to the motor bus by municipal governments and railway executives has resulted in a pro-

(*Continued on page* 1004)

Business in Brief

NEW YORK, Nov. 15—Trade and manufacture are about the best since the late spring of 1920. A rapid rise in prices of textiles and their raw materials has given rise to talk as to the effect on the ultimate consumer of this steady climb. There has been a general increase in price level of all commodities with an accompanying rise in sales and output.

There has been a little freer movement of cars, and this has helped the farmer to cash in on his crops. The car shortage, however, remains the greatest in history.

Car loadings for the week ending Oct. 28 were 1,014,480, showing a gain for the week of 10,721. With one exception this was the largest weekly loading in the country's history. The increase was again in merchandise and miscellaneous.

The prospects for winter wheat crops are good. Farmers complain of labor shortage for husking the corn crop. Wheat exports from this country and Canada were the second largest of the year.

Pig iron production gained 29 per cent over the previous month. Steel approached the October, 1920, output. Building construction gained all over the country. Mail-order and chain-store sales increased 28 per cent over September.

Coal output gained slightly over the previous week. Production of bituminous approximated 10,700,000 and that of anthracite 1,800,000 tons.

Bank clearings fell off 15.7 per cent, but it was a holiday week. Stocks and bonds were irregular. Results of the election were not regarded as disturbing, although causing market irregularity for the moment. Money continued firm.

End May Come to Harley Trusteeship This Month

SPRINGFIELD, MASS., Nov. 14—Plans are maturing to the end of terminating the trusteeship of the Harley Co. before the end of this month. This may entail a re-organization of the concern. Conferences at present look to a compromise between A. W. Morris and associates and the Hendee Manufacturing Co., which has been desirous of regaining control of the property through foreclosure proceedings.

It is believed now that the drop-forging department of the plant will be in operation some time in December for the manufacture of forgings for automobile and motorcycle parts.

New Company Formed to Continue Simplex

Buys Plant and Assets from Mercer Motors—Capitalized at $500,000

NEW YORK, Nov. 13—The Crane-Simplex Co. of New York, Inc., with a factory in Long Island City and executive headquarters at 115 Broadway, has purchased from the Mercer Motors Co. the plant and assets of the old Simplex Automobile Co. and has resumed the manufacture of the Crane-Simplex, discontinued in 1917, when the Government took over the plant for carrying on war work.

The new company, which is capitalized at $500,000, all preferred stock, will confine itself to the manufacture of the chassis only, which will list at $10,000, and which will be essentially the old Simplex with a six-cylinder engine with 4.375-in. bore and 6.25-in. stroke and a wheelbase of 143.5 in.

Plans 100 Chassis Yearly

It is planned to make 100 chassis a year and the output for the next five years has been taken by a selling organization, the Crane-Simplex Distributing Co., 200 West 59th Street, New York City. In addition, the new company controls the Jephson-Scott body plant at East Orange, N. J., formerly Quinby, and if a customer wishes it a Jephson-Scott body will be fitted, although that is not compulsory.

Officials of the manufacturing end of the Crane-Simplex company include L. R. Ayer, treasurer of Lawrence Chamberlain & Co., a financial house at 115 Broadway, who has been elected president; J. H. Bawden, who has been with the Mercer company for the past 12 years, vice-president and general manager; Harvey B. Clark, who has been identified with Simplex since 1905, treasurer; Frederick H. Brand, also a Simplex veteran, assistant treasurer, and W. B. Sheahy of the law firm of Breed, Abbott & Morgan, secretary.

Takes Over Crane Company

The organization has also taken over the Crane Motor Car Co., which has been affiliated with Simplex, although H. M. Crane is not identified with the proposition. This arrangement carries with it the Crane overhead 4 x 6 engine, which will be developed by Bawden for future use, although it will not be used in the Simplex now being manufactured. Service on all Simplex cars manufactured since 1906 will be given by the new company.

After the manufacture of the Simplex was discontinued in 1917 the Government held possession for two years, using the plant for building Hispano-Suiza engines. In 1919 Mercer Motors Co. of Trenton, N. J., bought the assets, and when Mercer severed connections with Hare's Motors it took the Simplex assets with it.

Earl Quits; Company Will Be Reorganized

Resignation Follows His Failure to Get Additional Support from Bankers

DETROIT, Nov. 13—The resignation of Clarence A. Earl as president and general manager of Earl Motors, Inc., formerly the Briscoe Motors Corp., Jackson, effective Oct. 31, has been accepted by the board of directors, and steps preliminary to a reorganization of the personnel and finances of the company will be taken at a meeting of the board this week. Earl's resignation followed a period of plant inactivity extending back several months.

Financing undertaken by Earl in the spring of 1922 was only partly completed, and after a period of good business up to Sept. 1, the company again found itself in need of funds.

Since September the company has been operating on a basis approximating 100 cars a month, far below the output necessary to keep it on an earning basis. Attempts by Earl to raise support necessary to place the company in a satisfactory earning position were fruitless with the bankers opposed to him. In this position there remained nothing for Earl to do but resign, and the resignation was accepted at a meeting in New York.

Big Task Faced Earl

Earl joined Briscoe in 1921, following his resignation as executive vice-president of Willys-Overland. The name of the company and of its product was changed in the fall to Earl Motors, making the Earl car. Taking over the company Earl faced the task of liquidating a heavy inventory which was practically wiped out this spring when the last of the Briscoe models were disposed of.

As it stands to-day the company is cleared of inventory and has a good dealer organization but is short of working capital. It is declared that this now will be provided by the bankers with an entirely new organization. George C. Scobie, vice-president and treasurer, has been in Chicago during the week working with bankers on plans for the reorganization. The plant temporarily is under his direction.

The troubles of Earl and the Earl company were augmented this spring by the fall of the Fort Dearborn Bank, Chicago, which had been the financial backer of the company, and instrumental in bringing Earl with the company. Following his resignation, Earl gave up his apartment in Jackson, and with Mrs. Earl has gone to Virginia with Mr. and Mrs. W. R. Reynolds, where he will take several months' rest before undertaking a new connection in the industry.

PERFECTION TIRE RECEIVER

WILMINGTON, DEL., Nov. 11 — Charles C. Keedy has been appointed receiver for the Perfection Tire & Rubber Co., a Delaware corporation having its principal offices in Fort Madison, Iowa. The petitioner is the Nemours Trading Co.

Next Year Will Prove to Be One of Best in History of Motor Truck Branch of Industry

By FRED J. FISHER,

Sales Manager of the Standard Motors Co.

Detroit, Nov. 10.

IMPROVED conditions in the truck business are becoming more evident as the year advances and the next three or four months should witness a definite turn for the better. I am looking for 1923 to be one of the best years we have had and am confident that the next five years will be a period of increasing prosperity for the well-financed manufacturer and dealer.

Business in the large Eastern cities and on the Coast is already resulting in a large volume of sales in all classes of trucks, particularly the lighter ones. This better business is attracting to truck merchandising and distribution the type of dealer and business man who can provide ample capitalization for his company, and lack of just such distributive sources has been the truck industry's most serious handicap in recent years.

With soundly financed companies, dealers will receive the proper financial co-operation from banks. Except in the larger cities of the country there have been few truck dealers organized on a basis that would warrant bankers in extending to them required credit accommodations. Men with capital have not seen fit to engage in the truck business up to this time, but with promise of steady returns on their investments this condition will be overcome.

Shortage of railroad equipment is creating new demand for truck operation all the time. Much of the business in trucks to-day is due to the inability of railroad companies to meet shipping requirements and manufacturers and business houses of all descriptions are compelled to use trucks to maintain operations. Many manufacturers to-day are unable to make long distance deliveries because of the rail car shortage, but are doing almost normal localized business through use of trucks.

With better roads and more of them from year to year, the cost of truck operation will be greatly reduced and the radius of operations will be extended. Business houses and manufacturers now using trucks because of rail conditions will continue to use them. Hundreds of trucks which have been lying idle for the past year or more are again in service and are being worked to a point where they will soon have to be replaced.

Building operations in cities have been responsible for the coming into use of hundreds of trucks which had been taken in trades and which have been tying up dealer capital. With the many operations which must be undertaken in all parts of the country in the near future I look for plenty of work for all trucks and believe there will be some little difficulty in meeting demands. Farmers have been economizing at the expense of trucks and other necessary equipment which they will have to have, and their coming into the market will be a large source of business.

Without the European markets to take the surplus of American crops the farmer is unable to get the best prices for his products but European conditions will be improved in 1923.

Stockholders Must Raise $250,000 to Save Comet

DECATUR, ILL., Nov. 15—The sum of $250,000 must be raised by the stockholders of the Comet Automobile Co. if the proposed re-organization plans are to be carried out, according to the latest developments in the receivership. If this money can be raised, the indebtedness will be paid and there will be working capital to warrant resumption of production. If the money is not provided, there is danger of losing the assets.

The proposition has been presented to the stockholders for their consideration.

Judge Baldwin has issued a permanent injunction, restraining the Farmers State Bank & Trust Co. from disposing of the $250,000 in bonds held by it as security.

Republic Receivership Covers Claim of Banks

DETROIT, Nov. 13—The receivership of the Republic Motor Truck Co. has been extended to cover a claim of $2,500,000 filed by the Bankers Trust Co. of New York and the Guardian Savings & Trust Co. of Cleveland. The claim is secured by a mortgage held by the company, covering plants, factory, machines and equipment at Alma and some real estate at Euclid, Ohio. The mortgage is declared to be in default and foreclosure sale is sought.

Security Trust Co. of Detroit, the receiver, has been authorized to issue $100,000 in receiver certificates to maintain continued operation of the plant.

R & V INCREASING FORCE

EAST MOLINE, ILL., Nov. 16—The R & V Knight Motor Co., manufacturer of the R & V Knight four and six-cylinder cars, is gradually increasing its force in preparation for greater production.

Court Comes to Aid of Gramm-Bernstein

Appoints Receiver to Protect Interests While Reorganization Is Under Way

CLEVELAND, Nov. 13—The United States District Court at Toledo has appointed E. G. Kirby, Toledo banker, who is connected with the Commerce Guaranty Trust & Savings Co., receiver for the Gramm-Bernstein Motor Truck Co., at Lima, in order to protect the interests of stockholders, creditors and dealers. Through the appointment of the receiver, the company plant will be operated under the protection of the court. This will prevent a forced sale and the property being sold at a sacrifice. The assets of the corporation are placed at $2,500,000 and the liabilities at $1,600,000.

After being appointed, Kirby visited Lima, went over the assets of the corporation and deputized B. A. Gramm and Max Bernstein as manager of the property.

Suits Filed at Lima

The appointment of the receiver was precipitated by suits filed against the company in Lima. In the event judgments had been obtained in them, the property would have been sold at public auction and a loss entailed, according to H. O. Bentley, attorney.

Gramm and Bernstein will continue operating the plant until a reorganization, which is under way, is perfected. Approximately 95 per cent of the creditors have assented to the reorganization scheme as outlined by the larger creditors. This will permit the operation of the plant and the gradual paying off of debts. The five per cent of the creditors not assenting to the plan have started suit in Lima.

Shafer Informs Dealers

A. E. Shafer, general sales manager, in a letter to dealers says:

The severe depression, with its accompanying deflation, made it necessary for us, in common with many others, to write off large shrinkages in inventory and for other causes to get back to bed rock manufacturing conditions for the future. We are nevertheless pleased to say, with that done, our balance sheet still shows substantial figures on the right side of the ledger.

We have realized that to put ourselves in the most favorable position to seek and secure the large volume of truck business now plainly in sight for next year and beyond it would be necessary to effect a financial reorganization. Plans for doing that have been under way for some time and had progressed so favorably that fully 95 per cent of our creditors have assented. There was a small minority who, seeking special advantages for themselves, were inclined to act "the dog in the manger," willing and ready to upset the plans of the big majority.

Desiring to proceed to the earliest consummation of our plans, we yesterday invoked the United States Court to grant a friendly receiver in equity for the company, so as to preserve the interests of all, and with that done we now feel that we can work out our plans in the least time and without interference of any kind.

We wish to assure you that all departments of manufacturing, sales, service, advertising, etc., will operate uninterruptedly as before to the end that we may be able to complete all of our plans at the very earliest date, for a larger and stronger company. We bespeak your continued hearty co-operation and support.

The Gramm-Bernstein Motor Truck Co. is one of the pioneers of the industry, dating its beginning in 1901, when B. A. Gramm built a one-cylinder truck. In 1912 the concern had grown to considerable proportions and became the Gramm-Bernstein Co., a name later changed to the present title. Its plant, located at Lima, covers 241,000 sq. ft. of floor space, there being 10 buildings on the 9½-acre tract occupied by the company. It has a capacity of 4000 heavy duty trucks per year.

Of the authorized $5,000,000 capital stock $2,302,482 is outstanding. The company's balance sheet as of Dec. 31, 1921, shows the land, plant and equipment valued at $1,131,563; good will, patents, trade marks, etc., at $429,103; notes and cash receivable, $625,834; inventories, $1,807,414; deferred charges, $42,342; cash, $8,104. In the way of liabilities there were: capital stock, $2,302,482; 7 per cent serial gold notes, $450,000; notes payable, $941,267; accounts payable, $167,544; taxes accrued, $30,774; due officers, $18,644; reserve for interest, $21,463; dealers' deposits, $21,094; surplus, $91,092; total, $4,044,360.

Officers of the company are: Max Bernstein, president and treasurer; B. A. Gramm, vice-president and general manager; H. O. Bentley, secretary; Willard J. Gramm, chief engineer, and A. E. Shafer, sales manager.

APPREHENSION PAST OVER FUEL SUPPLY

WASHINGTON, Nov. 13—Continued improvement in conditions relating to fuel supply has made unnecessary the continuance of the surveys and reports which the United States Chamber of Commerce has been collecting to cooperate with the Federal fuel distribution agency, according to the president of that body, Julius H. Barnes.

He declares that the downward movement of prices and the increase in available supplies have removed the necessity for apprehension over the winter's fuel supply.

FORD TO EXPAND IN CHINA

WASHINGTON, Nov. 13—According to reports reaching the Department of Commerce, Henry Ford contemplates extensive manufacturing operations in China. It is said that Joseph Baille, Ford's personal representative there, has declared that technical training for 100 Chinese boys has been undertaken by Ford.

$2,115,828 Earned by Packard in Year

First Six Months Showed Loss—All Directors and Officers Re-elected

DETROIT, Nov. 13—Re-electing all its old directors and officers, stockholders of the Packard Motor Car Co., at their annual meeting, received the yearly report of the company showing net profits for the fiscal year of $2,115,828 on factory sales of $38,000,000. The earnings were all in the last six months, the first six showing a loss. Net current assets are seven and one-half times the current liabilities. The total assets are five times the total liabilities, including the company's outstanding bonds.

Cash and marketable securities are $16,288,689, sufficient to retire the remaining $7,400,000 outstanding 8 per cent bonds. Inventories have been reduced $7,500,000.

President Alvan Macauley, in a statement to the stockholders, said:

The company prepared during the depression for better times by improving its working personnel, decreasing its inventories, improving its facilities and developing a new product, with the result that we now are producing cars and trucks at the rate of 1800 a month. Our program calls for a production of approximately 2250 a month, commencing in December. This is the greatest output in the company's history and it is being accomplished with a smaller organization and a much reduced inventory.

Cash Position Improved

The general balance sheets show total assets of $56,308,090, a reduction of about $2,400,000 from last year, principally represented by the reduced inventory. The company's cash position has improved by almost six million. The surplus of $17,004,438 represents an increase of about $11,000,000. Current and accrued liabilities have been increased about $6,000,000, and reserve for contingencies has been cut from $2,500,000 to $750,000. Debentures outstanding have been reduced $2,453,000. No change has been made in preferred stock outstanding which totals $14,789,800. Total common stock is $11,885,100.

The stockholders' lists show 1555 holders of common and 3828 preferred.

NEW DEPARTURE AT MERIDEN

MERIDEN, CONN., Nov. 13—The $2,000,000 branch plant of the New Departure Manufacturing Co., which because of general business conditions has been idle since it came into the possession of the company, was put into production to-day, with a few hundred men employed.

It is expected that it will not be long before the whole of the annular ball bearing department now housed in the Bristol plant will be moved here and give employment to 3000.

Hinkley Adopts New Merchandising Idea

Will Sell Engines Direct to Truck Owners on Basis of Replacements

DETROIT, Nov. 13—Selling engines direct to fleet owners and individual truckmen on a replacement basis is the new merchandising idea adopted by Hinkley Motors, Inc., of Ecorse, Mich., maker of Hinkley heavy-duty automotive engines.

Figuring that any good heavy-duty truck should wear out at least three engines, the Hinkley company plans to furnish new engines to the truck owner direct to replace the worn-out power plant. This does not apply wholly to trucks originally powered by Hinkley, either, for by a new system of motor support, a Hinkley installation can be made in any truck of the front-radiator type regardless of the depth of the frame.

Another feature claimed for this idea is that owners of Hinkley-motored trucks can economize through being able to trade in their worn-out engines as part payment for a rebuilt engine, thus saving time usually lost in an overhaul as well as saving money.

Seventeen truck manufacturers who now are using Hinkley engines as standard equipment are reported to have indorsed the idea, and in preparation for carrying it out, the Hinkley company has appointed the following replacement plan distributors: Buffalo, Standard Welding & Manufacturing Co., 1156 Main Street; New York City, Gorey Automotive Parts Co., 354 West 50th Street; Pittsburgh, Parts Engineering Co., 3371 Bigelow Boulevard; Detroit, MacEwan & Shapley, 3169 East Jefferson Avenue.

Kissel Plans Projects to Increase Capacity

MILWAUKEE, Nov. 13—The Kissel Motor Car Co. of Hartford, Wis., which is erecting and equipping a new steam generating plant costing $150,000, is preparing to initiate several other projects to provide larger capacity because of the inroads made upon its reserve manufacturing facilities by a constantly enlarging distribution organization.

The program will be put into effect now that the demand for motor vehicles for the transportation of freight as well as passengers is approaching that settled condition when there will be a continuous, steady demand for cars, necessitating a dependable source of supply fully equal to the increased buying demands, officials of the Kissel company said.

While recent price reductions by some makers had a tendency to create an unsettled condition in the industry, the Kissel company has been only slightly affected. The fact that new distributors and dealers are of their own accord seeking new franchises indicates a belief that the buying of motor cars is rapidly getting to a known basis. In addition, the majority of new distributors and dealers are those already equipped with facilities and organizations to become active representatives immediately.

OWNER'S OPINION ASKED ON MODELS

NEW YORK, Nov. 13—J. C. Long, secretary of the educational committee of the National Automobile Chamber of Commerce, is sending out a questionnaire to 20,000 owners, asking them concerning their next purchase.

Long wants to know if they will buy an open or a closed car and why their preference. It is expected that this will bring replies that will be of great help to manufacturers in trying to anticipate the body demands for the coming season.

Nash Doubles Milwaukee Capacity in Three Years

MILWAUKEE, Nov. 13—"More than $20,000,000 worth of products have been shipped out of the four-cylinder Nash passenger car works since this industry was established in Milwaukee less than three years ago," said Ben W. Twyman, general manager of the division, in a talk before the Tripoli Shriners' Luncheon Club Friday noon.

He said further:

Ground was broken just three years ago. To-day we are rushing to completion additions which will double the original capacity. By March 1 we will be employing about 1800 men, against 1000 at present. In addition, there is being built adjacent to these works a new LaFayette plant which will employ from 800 to 1000 more.

Our four-cylinder production now is at the rate of 75 cars a day, and yet we are not able to fill all demands promptly. You may ask, where do all these cars go? When one considers that the Nash organization embraces 2000 or more dealers in nearly every country on the globe, our present output means that each can get on the average of less than one car a month.

It is a pretty poor dealer who can't sell that many—our Nash dealers are obliged to turn down several times that many cars each month due to our inability to make as many as they can sell. When we get to a schedule of 125 or 150 a day about March 1 it will mean that our 2000 dealers will be able to get on an average of only two a month.

FORD ADDITION IN CANADA

DETROIT, Nov. 13—Ford Motor Co. of Canada, Ltd., is advertising for bids for the construction of the first large building to be added to the Border City's plant. Building operations will start immediately following the awarding of contracts. The first building will be 1000 x 588 ft. A machine shop and tool shop are to follow, the first 288 x 688, the other 75 x 200. The building program calls for $6,000,000 expenditures in three years.

Ternstedt Now Able to Increase Output

Completion of New Buildings Gives It 300,000 Sq. Ft. More Floor Space

DETROIT, Nov. 14—The Ternstedt Manufacturing Co., builders of body hardware and metal stampings exclusively for automobile manufacturers, has completed the construction of three new buildings which will add about 300,000 sq. ft. of floor space to its former half million, and will give it capacity for practically double its former output. The company declares that its expansion was required by the certainty of greatly increased automotive activity in 1923 and the immediately following years.

The largest of the new buildings will be given over exclusively to the manufacture of window regulators for closed cars. It is essentially typical of the company's faith in the future of the closed car and an increase in the percentage of closed cars is look for in 1923 over 1922, probably as great as this year exceeded the best previous years. This building will cover an entire block and contain 125,000 sq. ft. of floor space.

New Administration Building

Building number 8, second of the new structures, contains 140,000 sq. ft. of space and will house the enameling, sash and windshield departments, tube rolling mills and polishing and plating departments. The third new building will be used for administrative purposes and contain all general and executive offices and the engineering and experimental departments. It contains 35,000 sq. ft. All three will be in complete operation by the first of the year.

The immediate effect of the expansion will be to relieve the congestion of manufacturing in all departments, practically all of which are doubled. The company will now have double its former foundry and storage space, the latter being especially important at this time owing to uncertainty of freight movement.

The company will have 500 stamping presses with a daily steel consumption of 100 to 150 tons.

Continue Standards Effort

With its expansion, the company will continue its efforts toward standardization of automobile hardware work in which it has made extensive progress in the past two years. By reason of its specialization and large facilities, it has been enabled to hold to several types a sufficient variety of hardware to care for the needs of cars in every price class in the industry. In the past year a new line of door locks and curtain rollers has been developed.

The company is directing its policy toward the sale of its hardware in sets, so that inventory of its customers may be held strictly in balance at all times. A large percentage of its business is now being placed on a set basis.

Trucks Saved Nation During Rail Crisis

Julius H. Barnes Says Their Volume of Haulage Prevented General Collapse

DETROIT, Nov. 11—If the 2,600,000,000 tons transported by railroads in the last year had not been supplemented by the 1,400,000,000 tons carried by motor vehicles, there probably would have been an utter collapse in the United States, Julius H. Barnes, president of the Chamber of Commerce of the United States and of the Transcontinental Development Co., said in an address at the Board of Commerce meeting here this week.

The situation in transportation has been clearly saved by the motor industry and public highways, he said. In the field of motor transport the play of natural law of supply and demand has saved the day. The advantage of the motor transport with its flexibility of delivery and its elasticity of road service is clearly apparent, he said, as long as the public highways afford road beds free and open to its operation.

Road Development Important

It certainly is true, he stated, that part of the railway channels of to-day never would have been built in competition with the more liquid motor transport, if that transport had then been in existence. This suggests again, he said, the vast potentiality of the motor industry in those sections of the world where vast tonnage is to-day awaiting only reasonable access to market. He cited Russia, Asia, Africa and South America as waiting only highways for development and prosperity.

Smaller growth in agricultural population in the last twenty years was taken by Barnes as a favorable omen in that it showed greater efficiency and the use of machinery rather than of man power. In this time the general increase in population of 40 per cent has found only a four per cent gain in agricultural sections, he said, but the products of farm have increased 50 per cent and the number of farms 13 per cent.

Lack of Transportation, Farm Drawback

The only drawback to the prosperity of the farmer, Barnes declared, is the lack of proper transportation facilities, and for this, he said, the farmer has only himself to blame. Agricultural policy toward the railroads has always been one of forcing for lower rates, thus undermining earning power and destroying credit, Barnes said. Resultant failure in proper expansion of equipment costs the grain farmers of the Middle West one to two million dollars each day of marketing.

Later in the day Barnes was the guest of C. S. Mott, vice-president of General Motors, at a dinner attended by many leading automotive executives.

S. A. E. NUMBER CODE MAY REACH ALL STEEL

WASHINGTON, Nov. 13—A conference to consider the desirability of providing a system of designating qualities or kinds of steels by code numbers has been called by the American Engineering Standards Committee at the request of the United States Bureau of Standards. The conference will be held in the Department of Commerce Building Dec. 6.

This conference will attempt to determine the desirability of applying a uniform numbering system to forging steels, casting steels, structural steels, including plates, tool steels or other steels not so classified.

The Society of Automotive Engineers already has formulated a system now in wide use, applying to the steels used in automotive practice, and there has been considerable discussion as to the advisability of applying such a system more generally.

Among those attending were Alvan Macauley, president of Packard; F. J. Haynes, president of Dodge Brothers; A. T. Waterfall, vice-president of Dodge Brothers; William R. Wilson, president, Maxwell; A. P. Sloan, Jr., vice-president, General Motors; Fred J. Fisher, president, Fisher Body Corp.; H. H. Bassett, president of Buick; A. B. C. Hardy, president of Olds; G. H. Hannum, president, Oakland; W. L. Day, president, General Motors Truck; W. S. Knudsen, vice-president, Chevrolet; C. F. Kettering, president General Motors Research Corp.; Norval A. Hawkins, General Motors; E. T. Strong, sales manager, Buick; A. H. Swayne, vice-president, General Motors; B. G. Koether, vice-president, Hyatt Roller Bearing, and W. C. Boynton, General Motors.

Road in South Increases Its Motor Rail Service

BIRMINGHAM, ALA., Nov. 14—According to an announcement by President John T. Cochrane, the Alabama, Tennessee & Northern Railroad will shortly increase its motor car service, having purchased additional equipment for this purpose.

About the first of May the road put its first rail car in operation on its lines from York south. The service has proved so popular that the corporation has found it advantageous to increase it. The new service is expected to be in operation by the end of November.

The A. T. & N. is a road of about 200 miles in length and serves one of the richest portions of Alabama. Cochrane has notified the patrons that no steam trains will be annulled and that the motor car service, which he considers faster and more satisfactory, will be in addition to the other service of the road.

Wherever motor cars have been placed in service by the roads in the South, they have become immensely popular.

Milk Shippers Hear Fenn Argue Trucks

In Annual Meeting They Are Told of Plans for Motor Transportation

SPRINGFIELD, MASS., Nov. 14—At the annual meeting of the National Milk Producers' Federation here, the question of improving facilities of distribution and cutting transportation costs occupied a prominent place in the discussions. This side of the dairyman's business has become an acute problem, it was explained, because of the rising costs of production and the uphill battle for better railroad rates.

Frederick W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce, spoke on the importance of motor transport in milk distribution.

Motor truck service may be made available to the farmers throughout a given territory, he stated, either by carrying the product in horse-drawn vehicles or small trucks to pick-up points, or by a joint arrangement which may consist simply of a single farmer making the deliveries for a group, enabling the rest to be engaged in other work at home or through a co-operative association.

On Co-operative Basis

In the latter event, he said, the capital required should be furnished by persons whose product is handled, the individual investment being proportioned to individual use of the facilities. A reasonable interest charge should be set against operating expenses, aside from which the service should be at cost. In determining the method in a given instance, the different factors should be carefully considered, he said, one of these being the laws governing co-operative associations, which vary in different States.

As the means of promoting efficiency and profit in moving milk with motor trucks, he mentioned, first, the equipping of the trucks with glass-lined thermos tanks, which secures a lower acidity test, better temperature, freedom from churning, no appreciable shrinkage, less ice per gallon, elimination of storage capacity before pasteurization and a large saving of labor.

Trailers Would Assist

The moving of milk by truck may be further facilitated, he explained, by the introduction of trailers with tanks mounted on them and equipped with solid rubber tires eight inches in diameter front and rear.

An essential to successful operation, he added, lies in the use of an accurate cost accounting system, enabling a perpetual inventory to be kept with the costs arranged under two separate heads, fixed and variable; the first to comprise such items as charges for retiring investment, interest, insurance, etc., and

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Oil Classification Agreement Reached

Conference at Washington Discusses Specifications of S. A. E. Committee

WASHINGTON, Nov. 13 — Members of the Society of Automotive Engineers, the Government Interdepartmental Petroleum Specifications Committee and representatives of the American Petroleum Institute joined here to-day in discussing specifications for engine lubricating oils prepared by the Lubricants Division of the S. A. E. Standards Committee with a view to reconciling these with present Government specifications.

Most of the discussion dealt with the classification of oils in respect to viscosity and the temperature at which this viscosity should be measured.

The S. A. E. and A. P. I. representatives finally agreed to the following classification based on viscosities at 130 deg. Fahr.:

No.	15	Light	150*	at 100 deg.	Fahr.
No.	20	Light	200	at 100 deg.	Fahr.
No.	30	Medium	300	at 100 deg.	Fahr.
No.	40	Medium	400	at 100 deg.	Fahr.
No.	50	Heavy	500	at 100 deg.	Fahr.
No.	60	Heavy	60	at 210 deg.	Fahr.
No.	80	Extra Heavy	80*	at 210 deg.	Fahr.
No.	95	Extra Heavy	95	at 210 deg.	Fahr.
No.	115	Extra Heavy	115	at 210 deg.	Fahr.

*Saybolt seconds.

It was the sense of the meeting that acidity and emulsion tests of engine oils are of such questionable value as indicating the value of the lubricant that they should not be included in specifications.

Oil men who attended the meeting favored an increase in carbon residue allowable in Conradson test, but a motion to this effect was voted down by automotive and Government representatives.

Federal Revision Approved

WASHINGTON, Nov. 11—The Interdepartmental Petroleum Specifications Committee has announced that its latest revision of the Federal specifications for petroleum products was approved by the Federal Specifications Board on Oct. 31.

The outstanding changes in regard to motor gasoline provide that the initial boiling point shall be lowered from 140 to 131 deg. Fahr., and the 90 per cent point raised from 374 to 392 deg. Fahr. When the specification for motor gasoline was last amended in 1919, it was hoped that the specification would be satisfactory for at least two years. It has actually been in effect three years, and improvements in the refinery practice in this period have indicated that the specification could be modified to advantage. This has accordingly been done.

The specification for domestic aviation gasoline has been modified to allow the use of cracked gasoline in cases where the material is to be used within three months. A few minor changes have been made in some other specifications.

The specifications in force previous to Oct. 31 are given in Technical Paper 305 of the Bureau of Mines, and the methods adopted by the committee for testing petroleum products in Technical Paper 298. It is planned to publish the revised specifications, together with the testing methods, as Technical Paper No. 323, which will be issued by the Bureau of Mines as soon as possible.

OAKLAND SENDS CARS EAST, USING EXPRESS

PONTIAC, MICH., Nov. 13—Oakland Motor Car Co. shipped several carloads of closed models into the New York territory last week by express to overcome delays occasioned by freight movement in getting cars into buyers' hands. The company reports it is the first express shipment of cars in two years. The Oakland company now is in full production of its closed models and regular shipping schedules are starting at once.

S. A. E. and Service Men Will Hold Joint Meeting

NEW YORK, Nov. 11—A joint meeting of the Society of Automotive Engineers and the Automotive Service Association of New York will be held in this city on Feb. 1. Each organization will be represented by one or more speakers and the meeting will be more or less in the from of a debate, the subject being "Does factory engineering organization and practice give full consideration to service station progress?"

While the final plans have not been worked out for the meeting, it is understood that J. Willard Lord, service manager of the Harrolds Motor Car Co., Pierce-Arrow distributor in the Metropolitan territory, will lead the discussion for the service men.

Indiana Holds Meeting

INDIANAPOLIS, Nov. 14—The Indiana Section of the Society of Automotive Engineers held its November meeting and dinner, with Fred E. Moskovics, vice-president of Nordyke & Marmon Co., as the speaker.

Moskovics discussed the value the service department can render the engineers by keeping tab on the cars, their results and the suggestions and complaints of the motorists.

Schlesinger to Speak in Chicago

CHICAGO, Nov. 11—Dr. H. I. Schlesinger, professor of chemistry at the University of Chicago, will address the Midwest Section of the Society of Automotive Engineers Nov. 24, 7:30 p.m., at the Monadnock Building. His subject will be "Reaction Velocity and Catalysis."

Engineers Consider Proposed Air Code

Tentative Draft Expected Next Year—Aircraft Committee to Be Continued

WASHINGTON, Nov. 14—Representatives of the Society of Automotive Engineers participated in the conferences of the Aircraft Safety Code Committee, held at the Bureau of Standards. The provisions of the proposed code were discussed, and plans made for continuation of the work of the general committee. It is expected that a tentative draft of the code will be ready early next year.

There are five sub-committees, dealing respectively with airplane structures, engines, equipment and maintenance, lighter-than-air craft, traffic rules, signals, licensing of pilots, landing fields, etc. The committee is sponsored by the Bureau of Standards and the Society of Automotive Engineers. It is representative of all the important organizations in the country interested in aircraft.

Archibald Black, Garden City, Long Island, is chairman of the sub-committee on equipment and maintenance, representing the S. A. E.; R. H. Upson, Aircraft Development Corp., General Motors Building, Detroit, is chairman of the sub-committee on lighter-than-air craft, and George K. Mead, Wright Aeronautical Corp., Paterson, N J., is chairman of the sub-committee on bureau plans representing the S. A. E.

Hardy, President of Olds, Addresses Reo Executives

LANSING, MICH., Nov. 13—A. B. C. Hardy, president of the Olds Motor Works, spoke last week to the Accelerator Club, composed of executives of the Reo Motor Car Co., on economic phases of factory administration. This is the first time the club has had as its speaker the president of a competing company.

Last month was the second largest October Olds has had. During the month, 414 cars were shipped to San Francisco, and this number would have been exceeded but for freight car congestion and oversale of closed models. New York took 248 cars, and 360 unfilled orders were reported carried over. Wholesale sales in the Minneapolis territory doubled sales for the same months in the past two years.

DUESENBERG LOSES APPEAL

WASHINGTON, Nov. 13—Duesenberg Motors Corp. lost in the Supreme Court of the United States its appeal from the Court of Claims award for damages under the war-time contracts, the Court of Claims being sustained. Claims aggregating about $1,400,000 against the United States for breach of contract and delaying the corporation in its manufacture of motor engines, and preventing its making its profits were involved.

Milwaukee Maintains Pace of Last Month

Experiences Difficulty in Delivering Closed Cars Because of Body Shortage

MILWAUKEE, Nov. 13—Production schedules of passenger car manufacturers in this district not only are maintaining the October rate, but in most instances factories are finding it a struggle to make deliveries on closed car orders from distributors and dealers. The call for open cars has encountered some of the expected let-down which the late fall season always has brought, but it still is surprising how well this demand is being sustained.

Despite the acute railroad freight situation as it affects supplies of materials and shipment of finished products, it appears that the main problem of passenger car factories at this time is in the body shops. Enclosed bodies are at a higher premium right now than they were at any time this year. Provision being made by all factories and by the body concerns here have not reached the stage where appreciable relief has been effected.

More Facilities Next Year

In most cases the additional facilities will not be available until after Jan. 1, because construction and equipment work was late in getting under way, inasmuch as the imperative need did not demonstrate itself until mid-year, or if it did, manufacturers were conservative and delayed such undertakings until absolutely certain that the new capacity would be occupied for a reasonable length of time.

Engine shops, manufacturers of frames, transmissions, gears, axles, etc., are keeping busy, and it is significant that output is going into hands of vehicle manufacturers as quickly as transportation means make it possible. In the case of makers of automotive equipment, jobbers are active buyers on the basis of an excellent fall demand from retailers, while car factors are absorbing an output equal to that of October, and in most cases slightly in excess of the September average, which manifested Ford effect.

Steps to Relieve Car Shortage

The railroad transportation situation, admittedly serious and acute, presents the grave prospect of the usual winter operating difficulties coming to be superimposed on the handicaps of car and locomotive shortage mainly responsible for the existing condition. A peremptory order was issued a few days ago by the Wisconsin Railroad Commission to all roads operating in the State to take immediate steps to relieve the car shortage by repair of rolling stock now standing idle and unfit for use. Daily reports are demanded of the results of the car repair work, distribution of empties, etc.

PEDESTRIANS TO TOE LINE IN NEW YORK

NEW YORK, Nov. 14—The Bureau of Public Safety, the newest branch of the New York Police Department, has been put into commission under the direction of Special Deputy Police Commissioner, Barron Collier, with Marcus Dow as the working head of the bureau. Dow was director of safety for the New York Central Railroad for 10 years and also is president of the National Safety Council, which has 3500 industries, employing 7,000,000 men, in its membership.

Dow will start out to educate the public as to the dangers of traffic and one of the first steps to be taken will be to install paths painted in white lines at crossings to prevent "jay walking." Dow also believes motorists need educating and he will insist that they start more slowly at crossings following the go-ahead signal of the traffic officer. He believes many accidents are caused in the rush of drivers to get up to speed in a short distance.

The Milwaukee Association of Commerce has appointed a special committee of five traffic and five railroad men which is issuing bulletins urging all members to load to capacity, unload promptly and in the case of less than carlots, to call for freight at railroad depots to avoid congestion. James Angove, traffic manager, Harley-Davidson Motor Co., is a member of the committee.

Retail Situation in Milwaukee

A demand for closed cars which the majority of dealers are not able to meet promptly is keeping on a straight line the trend of retail sales, notwithstanding the decline in open car sales. Not all dealers are so fortunate as others, and reports concerning current demand are more conflicting, but in a general way trade is far above expectations.

Rainbow Tire to Start By Manufacturing Tubes

COLUMBUS, Nov. 14—The Rainbow Tire & Rubber Co., which was incorporated during the World War with an authorized capital of $1,000,000, soon will start operations in its new factory at Delaware, Ohio. Charles Ross is president, M. J. Bergin, vice-president and secretary, and C. A. Morrison is treasurer.

Production of automobile tubes exclusively will be started about March, 1923. These tubes are known as the "Truss," as trusses are made throughout the center. They are both vacuum and suction and are made in halves.

New presses and heaters, as well as mills and curing machines will be installed in the factory to build the tubes.

122 Cu. In. Is Limit for 1923 Grand Prix

Maximum Weight of 1410 Pounds Without Fuel Provided in French Rules

PARIS, Nov. 7 (*by mail*)—A maximum piston displacement of 122 inches, a minimum weight of 1410 pounds without oil or gasoline, a tail limited to 49 inches beyond the rear axle, and a distance of 500 miles, are the main features of the official 1923 French Grand Prix rules just announced.

The event is open to all but ex-enemy nations, the number of cars per firm being five, and the entry fee 5000 francs per car, which must be filed before the end of the year. By paying double fees entries can be placed with the Sporting Commission of the Automobile Club of France until Feb. 29, 1923.

The French Grand Prix will be held on a road course during the first fortnight of July, the exact date to be selected after the course has been decided on. Candidates for the national French race are Lyons, which offers a subsidy of 300,000 francs; Strasbourg, which had the race last year; Touraine, and the district of Rambouillet, near Paris.

A fuel consumption race will be held over the same course on the day following the 122 cubic inch speed contest.

Officials of Birmingham Want Indictment Quashed

WASHINGTON, Nov. 14—Eleven officials of the Birmingham No-Axle Motor Corp. filed a motion in the United States District Court asking that the indictment brought against them be quashed.

The officials are charged with conspiracy to defraud by the use of the mails in the sale of several hundred thousand dollars' worth of stock.

They contend that the indictments fail to charge the commission of a crime under the laws of the District of Columbia and do not contain sufficient facts to apprise the defendants of the charge they are to meet. They also claim that the indictments do not show a conspiracy against the United States, and that they fail to allege sufficient facts to constitute in law a scheme or artifice to defraud or to obtain money by false pretenses in the sale of the motor stock.

OGREN INCREASES CAPITAL

MILWAUKEE, Nov. 13—An increase in authorized capitalization from $500,000 to $1,000,000 is one of the final steps taken by the Ogren Motor Car Co. in a general reorganization program. The company was established about five years ago and manufactures the Ogren Six, a custom-built car. Fred G. Smith, formerly of Cleveland, one of the original stockholders, has been made president and general manager.

Men of the Industry and What They Are Doing

Edwards Is Cole Factory Head

Announcement has been made of the appointment of H. J. Edwards as second vice-president and factory manager of the Cole Motor Car Co., Indianapolis. He has been connected with the automotive industry since 1898, when he served as assistant to Elmer A. Sperry, at that time builder of the Sperry electric cars and batteries at Cleveland. Edwards joined the organization of the Cleveland Automobile Co. in 1901 as superintendent and engineer, and later was made assistant to Robert Jardine at the Royal Motor Car Co., Cleveland, manufacturer of the Royal Tourist. In 1905 he became affiliated with the Dayton Motor Car Co., manufacturer of the Stoddard-Dayton, as factory superintendent and engineer, subsequently becoming vice-president and general manager. After the company was absorbed by the United States Motor Co., Edwards moved to New York and was in charge of the engineering of all the affiliated companies, until 1912 when he organized the Edwards Motor Car Co. in New York, building the Edwards-Knight. This firm was taken over by the Willys-Overland Co. in 1914 and moved to Elyria, Ohio. Edwards was given complete charge as manager and engineer of that plant, where all the engines for the Willys-Knight cars were produced. He served in that capacity for eight years.

Amos Appointed by Dodge

H. M. Robbins, director of foreign sales of Dodge Brothers announces the appointment of Frank B. Amos to direct the Dodge Brothers foreign advertising and sales promotion. For five years Amos was foreign advertising manager of the Studebaker Corp., later was with the American Exporter of New York City, and more recently served as vice-president and general sales manager of the Lalley Light Corp. of Detroit.

Finnegan Changes in Canada

W. E. Finnegan has resigned as director of sales of the Ruggles Motor Truck Co., London, Ont., and has joined the Beaver Truck Corp. in a similar capacity. Finnegan is an outstanding figure in the automotive sales and advertising field. In his capacity as director of sales for the Beaver Truck Corp. he will direct the sales effort in the export as well as in the domestic field.

Webster Returns from Europe

William M. Webster, commissioner of the Automotive Equipment Association, has returned after a four months' vacation tour of Europe and Asia. One of the features of the trip which he most likes to relate to his friends was the opportunity to play golf on some of the best courses in northern Scotland. Another thrill which he recalls with pleasure was provided by an airplane flight from London to Paris. His memories of passport and customs regulations are not so pleasant. He crossed international boundaries 17 times. At first he was able to keep his copious supply of good American cigars with him by paying duties which soon amounted to more than the original purchase price, but when he went into Germany they were taken from him.

Hemenway Back to Moline Foundry

Harold Hemenway, for many years prominent in the Moline factory district, but lately with the Peoria Malleable Iron Co., is returning to the Moline Foundry Co. as superintendent and director. The work of the superintendent has been in charge of S. S. Hoffman, president. The change does not indicate extensive expansion, it is explained, but will lighten the duties of the present plant personnel.

Hyatt Advances Woods

Walter H. Woods has been appointed sales engineer of the motor bearings division of the Hyatt Roller Bearing Co. in the Detroit district. He has been connected with Hyatt in engineering and sales capacities for four years in several parts of the country.

Chester Succeeds Thiers

John I. Chester has been advanced from vice-president to the position of president of the N. R. Allen's Sons Co., Kenosha, Wis., one of the largest tanneries of the Central Leather Co. group. He succeeds Edward C. Thiers, who resigned because of advanced age and moved to California. Chester began work in the Allen tannery as a currier less than 20 years ago. He learned his trade in Scotland, coming to America when 21 years of age.

Young with Lancaster Steel

Lancaster Steel Products Corp. has added to its organization R. M. Young, who takes over the Philadelphia territory, with offices in the Franklin Trust Building. As district sales manager, Young's territory will include New Jersey, north to and including Trenton; Pennsylvania, excepting the northwestern portion; Maryland, Delaware and West Virginia. Young comes to his new post from a large mechanical specialty company, for which he was assistant manager in the Philadelphia district.

Steenstrup in California

Peter S. Steenstrup, at one time vice-president and general manager of the General Motors Export Co., has located in San Francisco as district sales manager of the Buick Motor Co., with headquarters in the Balfour Building.

Rickenbacker Home Nov. 27

E. V. Rickenbacker, vice-president of the Rickenbacker Motor Car Co., who has been in Europe for the past two months, is returning on the Olympic, which is expected to dock in New York on Nov. 27.

Link-Belt Promotes Sayers

W. W. Sayers of the Link-Belt Co. has been promoted to the position of chief engineer of the company's Philadelphia works and eastern operations. For many years Sayers represented the company in Chicago territory in the lines related to power house machinery, coal storage, pack carriers, crushers, etc.

Paul M. Lockwood Appointed

Paul M. Lockwood has become general sales manager of the automotive division of the Rossendale-Reddaway Belting & Hose Co., with mills in Newark, N. J., and general sales offices in the Woolworth Building, New York. He was formerly with the Lockwood Manufacturing Co., Kansas City.

Chevrolet Regional Head

D. S. Eddins has been appointed regional manager of the Atlantic coast region comprising the following zones: Tarrytown, N. Y. (including the New England district), Buffalo, Pittsburgh, Baltimore and Atlanta. He will supervise all sales and operations and all matters pertaining to sales, and will have charge of all distribution of production from Tarrytown and Buffalo plants. Headquarters of the new regional manager will be at Tarrytown.

Milburn Has New Plan for Buying on Time

TOLEDO, Nov. 13—Announcement of a time payment plan has just been made by the Milburn Wagon Co., manufacturer of Milburn electric trucks. One plan embraces payments over a 12 months' period, the second, payments over 21 months. Substantially all other details of both plans are the same.

The first payment is made when the order is signed, and amounts to 10 per cent of the total purchase price; the next payment is made on delivery of the truck, and amounts to 15 per cent of the purchase price; freight and war tax being paid at this time. This leaves a balance of 75 per cent which is divided into equal monthly installments, and either is spread over the 12 or 21 months.

Interest at 6 per cent per annum on unpaid balance is charged, plus an amount varying from $75 to $220 to cover the cost of time-financing and insurance, the difference being due to the size of truck and length of time credit is required.

A. E. A. Is Not Likely to Close Show Again

Compromise Probably Will Be Effected So as to Admit Non-Members

CHICAGO, Nov. 15—It seems certain that the Automotive Equipment Association is holding this week its first and last closed show. The manufacturer members are practically unanimous in favor of admitting non-member jobbers to next year's business exhibit, while the jobber members are about as strongly opposed. The jobbers, however, have come forward with a plan for a show closed to non-members, with the exception that outside jobbers approved by the board of directors may be admitted as guests. It is expected that this compromise will be adopted before the convention, being held coincidentally with the show, adjourns at the end of the week.

The jobbers started the movement for the closed show this year with the claim that the large attendance of non-members made it impossible for manufacturers and their representatives to give the jobber members proper attention in their own show. The manufacturers on the other hand argued that, in view of the cost of exhibiting, they should have the right to invite non-member jobbers to see their exhibits.

Doors Will Be Opened

Next year's show probably will have exhibit space limited to members as at present, but the doors will be opened to jobbers as suggested by members and approved by the directors.

The exhibit this year, though a closed show and having a smaller attendance than the three previous exhibits, is producing business. Actual orders and prospects indicated in the interest shown by jobbers and their buyers in the many new and already tried products exhibited have indicated a bright outlook for 1923 in the equipment business.

The convention will elect officers Friday. The nominees are Nelson H. Oliver, Metal Specialties Manufacturing Co., Chicago, for president; W. E. Wissler, Herring Motor Co., Des Moines, for vice-president; E. V. Hennecke, Moto-Meter Co., Long Island City, chairman of the board of directors.

More than 500 delegates and 1000 manufacturers' and jobbers' representatives are in attendance.

MONROE BODY PLANT BURNS

DETROIT, Nov. 15—The plant of the Monroe Body Co., Ludington, Mich., manufacturing commercial bodies for Durant subsidiaries, was destroyed by fire this week with a loss of $150,000.

CONTINENTAL CALLS IN STOCK

DETROIT, Nov. 16—The Continental Motors Corp. has issued a call for all its outstanding preferred stock, estimated at about $2,100,700, to be redeemed Jan. 15 at $1.07 and accrued interest. The retirement of this stock is part of a plan formulated when stockholders authorized an increase in common stock from 1,500,000 shares at $10 par to 3,000,000 shares no par.

Ford to Build St. Louis Plant Costing $5,000,000

ST. LOUIS, Nov. 15—Construction of a new Ford plant in St. Louis to cost approximately $5,000,000 is projected for next year, according to a statement made by Henry Ford in Detroit.

Ford said that the new plant, which will be five times as large as the present Ford assembly plant here, would be built primarily for assembly, but would have facilities for expansion into the manufacture of parts. The plans as drawn contemplate a main plant, one story high, 1500 feet long by 300 feet wide. Auxiliary plants for wood working and production of certain parts are contemplated. The plant as at present planned would employ about 1200 men.

Two sites are said to be under consideration. One is a 30 acre tract on the Mississippi River in St. Louis proper and the other is in East St. Louis.

Stockholders to Consider Dissolving Ohio Tractor

COLUMBUS, Nov. 14—The Ohio Tractor Co., which has been manufacturing farm tractors in a large plant here, may soon be dissolved if the plans of the officials are carried out. The concern was reorganized about three years ago, and the name changed from the Columbus Tractor Co.

The company developed and put on the market the "Farm Boy" tractor, which had fairly good sales for a while. A meeting of the stockholders has been called for Nov. 29, to discuss the matter of dissolving, and sentiment appears to be favorable to the proposition. Fred A. Miller, is president; W. D. Singleton, vice-president, and W. F. Garrett, secretary and treasurer.

MOTORS MORTGAGE RECEIVER

PITTSBURGH, Nov. 16—The Real Estate Trust Co. of Pittsburgh has been appointed ancillary receiver of the Motors Mortgage Corp. of Delaware, which is engaged in lending money in financing automobile sales. The corporation has a capital stock of $15,000,000. It is stated that on Oct. 31 last, the assets amounted to $2,474,772 and liabilities, $6,686,220.

NEW AUBURN LIGHT SIX

AUBURN, IND., Nov. 17—The Auburn Automobile Co. will shortly bring out a new light six model. It will be smaller than the present six-cylinder model, which will be continued. The new model will be furnished with both open and closed bodies.

Service Bodies Get Convention Approval

Speakers at Meeting in Chicago Testify to Value of Local Association

CHICAGO, Nov. 15—Local service associations received a splendid recognition of their value to the industry on the second day of the Factory Service Managers' Convention, held at the La-Salle Hotel, when the delegates went on record as unanimously endorsing them.

The entire second day was devoted to the cause of the service association, the program being opened with a three-corner discussion, Alexander Johnston, editor of *Motor*, representing the interest of the owner; Eugene Silver, Cole distributor in Chicago, representing the dealer, and B. B. Bachman, chief engineer of the Autocar Co., representing the factory.

Johnston cited the great number of letters from car owners received by his publication asking for service information and of the great number of complaints of overcharge on the part of garages and stations. He came out in favor of flat rates as a means of giving the owner definite information in advance on service charges, and said that he believed that the formation of service organizations would help greatly in eliminating injustices to car owners.

Instances of Help Cited

Silver told of the great benefit the local association had been to Chicago dealers, and cited several discoveries made by service managers at the first meeting. They found for one thing that they were losing much accident and fire insurance business because those who underbid them were buying their own worn out parts that they had sold for junk and using them. They also found that they were being victimized by alley repair shops that bought genuine parts from them and later returned pirate parts for refund, so that the authorized dealers were actually carrying pirate parts in their own stock bins.

Bachmann told of the constant work of the engineering department to build a vehicle that would not only sell, but would continue to give good service after it was sold, and said that, beside the designing engineer, there was room for two other kinds of engineers, production and service. He believes that service associations can do much to assist in servicing the owner properly through co-operation.

Other Subjects Discussed

After a formal report of the service committee on the first day of the convention, brief addresses were made followed by discussions on the saving of transportation costs by shipping parts in carload lots, the separation of taxable and non-taxable parts, parts discounts to independents, the proper boxing of parts for shipment to save expense, etc.

Dealers Meet Schwab at Stutz Gathering

Hear, Also, of Eight New Body Styles That Will Form Speedway Four Series

INDIANAPOLIS, Nov. 13—Stutz distributors gathered here this week to receive an announcement of a new Stutz series and meet Charles M. Schwab, now in control of the company. Plans for the coming year were outlined, and the distributors were told that retail sales have not varied more than 1 per cent from factory production during the current year and that they have increased more than 200 per cent in 1922 over previous years. Orders on hand for the remainder of the fall and winter months indicate an unusually flourishing condition for this period.

The new line announced is to be known as the Stutz Speedway Four series, and while no chassis changes have been made, there are eight new body models in the line, which includes a seven-passenger phaeton, a four-passenger sportster, a de luxe Bearcat roadster, seven and four-passenger California type models, a coupé and a five-passenger custom-built sport-sedan. Prices range from $2,450 for the standard roadster to $4,550 on the custom-built job, not much change from the old line. The new models are listed as follows:

Model	Price
7-pass Phaeton	$2,640
4-pass. Sportster	2,790
2-pass. Roadster	2,450
De Luxe Bearcat Roadster	2,760
7-pass., California top....	3,015
4-pass., California top....	3,165
4-pass. Coupe	3,490
5-pass. Sportsedan	4,450

New Models Supplement Regular Line of Davis

RICHMOND, IND., Nov. 14—The Geo. W. Davis Motor Car Co. announces a new phaeton, model 70 which is mounted on the 71 chassis. The body is finished in royal blue with brown Spanish leather upholstery. The radiator is nickel plated and the equipment includes disk wheels, military steps, skirt fenders and a one-piece windshield. The price is $1,195.

Other models in the line for 1923 are the Legionaire, a 4-passenger sport model, $1,495; a coupe, $1,795; and Californian, a car with a year round top. These are in addition to the regular line models.

VELIE PLANS FEW CHANGES

MOLINE, ILL., Nov. 16—Daily production of between 30 and 40 cars is being continued by the Velie Motors Corp. About 30 per cent of this output is closed cars. Officials of the company state that they expect to continue indefinitely production of the present models.

The Velie-built engine which they have been using about a year has given unusual satisfaction, they say, and they have worked out comfortable and well-appearing body designs which they expect to continue. The only changes likely to be made are minor refinements, it is stated.

Dorris Adds Pasadena to 1923 Body Styles

ST. LOUIS, MO., Nov. 14—The Dorris Motor Car Co. has added the Pasadena to its line of body styles for 1923. The new body is mounted on the standard chassis and is a four-passenger sport type. A trunk is mounted on an aluminum rack attached to the frame at the rear of the car, together with a tire carrier for two tires.

Stock colors for the new model are Holland blue, maroon and gun metal gray. A three-quarter inch body molding extends over the hood to the radiator. The upholstery is leather. The top is made of unlined Burbank material with natural wood bows with nickel fittings.

The instrument board is black walnut. A ventilator placed in the cowl is easily controlled from the dash. The windshield stanchions are bronze, nickel plated. Regular equipment is artillery wheels with 33 x 5 in. cord tires. The 12 in. barrel headlights, radiator shell and bumper are all finished in nickel.

Peerless Bringing Out Roadster Coupe, $3,300

CLEVELAND, Nov. 13 — Peerless Motor Car Co. has added a new body to the line, this a two-passenger roadster coupe to sell for $3,300. The rear and rear side panels are covered with a weather proof top material, and the interior is finished in motor cloth of a neutral shade. The cover on the rear deck lifts high and free and the storage compartment holds a good sized trunk or several suitcases.

Standard equipment includes electric rear signal, cowl ventilator, engine driven tire pump and Moto-Meter.

REVERE MOTORS SOLD

INDIANAPOLIS, Nov. 15 — Revere Motors was sold at judicial sale yesterday for $52,000 to a reorganization committee. Henry A. Kraut of Logansport is trustee for the proposed reorganized company. Adolph Munson of Logansport, C. H. Barnes of Chicago and Kraut represented the stockholders. Later they petitioned for a court order, asking that the receiver make out a deed to the buyer. This was the only bid for the plant.

PICCARD-PICTET SOLD

PARIS, Nov. 8 (*by mail*)—The Piccard-Pictet automobile factory at Geneva, idle since the firm went into bankruptcy, has just been sold by auction to a newly formed company, which intends to use it for the construction of the new Lancia "frameless" car. The factory changed hands at six million Swiss francs.

Expects Driveaways to Aid This Winter

Feat of Banner Year Should Be Duplicated, James S. Marvin Declares

NEW YORK, Nov. 13—"Given average favorable winter weather and road conditions, the automobile industry can deliver from one-third to one-half its output over the road," says James S. Marvin, head of the traffic division of the National Automobile Chamber of Commerce, discussing the present transportation problems and the future outlook for getting cars to dealers.

He says:

The railroad situation right now is unchanged but then we have been favored by good weather. Let a few good old fashioned blizzards come along and see the difference. The railroads are doing fairly well but they are not improving and we are liable to have a change of weather at any time. I think, however, that we will be able to meet the traffic emergencies and I am looking to driveaways to help materially.

Many Driveaways in 1920

In our record year, 1920, when we made 2,205,197 cars, our manufacturers delivered 470,867 over the roads. Even in the so-called bad winter months of January and February, we kept up a rapid pace, showing 29,283 in January and 43,719 in February.

If we could do this two years ago, how much easier will it be this winter, for since 1920 there have been miles and miles of improved highways opened up and, in addition, the various States have got busy in the matter of snow removal and our roads this winter are going to be able to give us service in consequence.

We are not disturbed by the closing of navigation, for the number of automobiles delivered by boats has been small when compared with the monthly production. Not more than 8000 cars a month are shipped by boats even at busy times.

Open and Closed King Cars Reduced in Price

DETROIT, Nov. 13—Reduction of $300 on the open models, $200 on the coupé and $150 on the sedan are announced by the King Car Corp. The new list is as follows:

	Old Price	New Price
Roadster	$1,795	$1,495
5-pass. Phaeton.....	1,795	1,495
4-pass. Sport.....	1,795	1,495
Coupe	2,400	2,200
Sedan, Regular.....	2,550	2,400

NEW MODEL OF INDIAN

SPRINGFIELD, MASS., Nov. 15—The Hendee Manufacturing Co. announces a new model of the Indian motorcycle, the Indian Big Chief. This is of 74 cu. in. piston displacement, designed to meet a demand for a super-power, high-speed cycle for use with sidecar. It embodies the same principles as the original Chief of 64 cu. in. and sells for $345, f.o.b. Springfield.

Each Month of Year Shows Tractor Gain

Federal Bank of Cleveland Says Prospects for 1923 Are Even Brighter

CLEVELAND, Nov. 15—Every month in 1922 so far has shown a substantial increase in tractor sales over the corresponding months of 1921, declares the Cleveland Federal Reserve Bank in its Monthly Business Review. Next year looks even better, and production for 1923 is starting with schedules much larger than those of the last two years.

The bank says:

The most hopeful phase of the tractor situation at present is the buying attitude of the farmer. While, broadly speaking, farm products are still out of line in exchange value for the products of other industries, the farmer is looking optimistically to 1923. In fact the farmers are more optimistic than retail dealers, who, despite the business now being done with farmers, are ordering quite conservatively and cautiously. The most notable improvements in business are from the sections of the country where crops have been best. Probably the South is the most productive of business now, while the poorest section is that where wheat predominates.

There has been some slight restriction of shipments from factories because production has been curtailed by shortage of labor.

Most of the tractor and implement companies have announced prices for 1923 trade. These average about the same as those which have prevailed for the last two or three months. In the new price lines guarantees against any declines prior to June 1, 1923, are quite general. One of the larger companies, however, is soliciting business under a price-less contract.

The Review then says:

"The atmosphere surrounding the industry is the most hopeful in many months. There are indications that the gradual improvement evident during the last few months will continue throughout the winter and that the selling season of 1923 will find the industry fully recovered from its adversity."

Rubber Association Asks Closer Touch with British

NEW YORK, Nov. 13—Following the meeting of the special committee of the Rubber Association of America, called to consider the cablegram from the Rubber Growers' Association of London, which asked that an international discussion of the restriction act be postponed until the effect of restricted production of crude rubber on the entire industry can be determined, Chairman H. Stuart Hotchkiss sent the following cable to the British:

The invitation extended to the Rubber Growers' Association to send a committee to the United States is prompted by a sincere desire for a better, broader and more sympathetic understanding between growers and manufacturers. We regret that our invitation is not accepted now, as we feel that the good of the industry requires a closer contact and we believe that if your members have the opportunity of meeting our manufacturers here we both would secure a broader vision than would be possible should we send a committee to London.

In reply to your inquiry as to the probable American consumption in 1923 we could upon receipt of advices from you as to the probable range of prices under the restriction act arrive at a closer estimate of the probable consumption.

While apparently nothing has been accomplished by this interchange of cablegrams, it is felt in rubber circles here that this is but a preliminary skirmish that will lead ultimately to the desired conference as soon as both sides have an opportunity to study the workings of the restriction act.

52,840,135 Transported by Fifth Avenue Coach

NEW YORK, Nov. 13—The annual report of the Fifth Avenue Coach Co. has been given out by the Transit Commission, showing that 52,840,135 passengers were carried at a ten-cent fare during the year ended June 30. This is an increase of 1,748,770 over the previous year.

Advertising and miscellaneous income totaled $94,949, an increase of $19,756 over the previous year. Receipts from livery service fell off $3,156 to $11,451. Total income was $5,390,414, or $191,478 more than last year.

Operating expenses were $3,710,753, or an increase of $200,230. Taxes rose $13,-710 to $610,358. The net income was $1,069,302, an increase of $22,462.

Number of buses in operation is set at 296, the number of employees 1407 and the salary and wage account as $2,-616,893, or an increase of $199,962.

Tire Exports to Mexico Will Show Gain Over 1921

MEXICO CITY, MEXICO, Nov. 10—Automobile tires to the value of more than $1,000,000 were imported from the United States during the first ten months of the present calendar year, according to unofficial figures made public here.

It is estimated that the value of tires imported from that country during the year 1922 will amount to approximately $1,500,000, as compared with $1,346,645 for the year 1921 and $1,438,777 for the year 1920.

In Mexico City there has been a failure or two of the plants that were originally engaged in manufacturing tires, but the industry is now believed to have passed the experimental stage. The fact that raw rubber is obtained from the wild guayule shrub which grows profusely in the more altitudinous parts of Northern Mexico and that this product enters into the manufacture of automobile tires is looked upon as an important advantage to tire makers here.

It is explained that but for the enormous business which is done in smuggling tires into Mexico from the United States the customs figures would show much larger imports. It is asserted that the value of smuggled tires amounts to several hundred thousand dollars a year.

Body Demand Forces Factory Expansion

When Work Is Completed Baker R. & L. Co. Will Produce 50 Bodies Daily

CLEVELAND, Nov. 14—The Baker R & L Co. is enlarging its factory one-third to one-half in order to take care of increasing demands for its products.

Work is in progress, and when it is completed the capacity of the company will be 50 completely finished bodies daily. The kiln and mill departments are being added to.

The announcement of the additions to the factory followed the annual meeting of the stockholders, at which it was stated the company had sufficient orders on its books now to keep the factories going at capacity well into the spring.

Dividends at the rate of 7 per cent on the preferred and 4 per cent on the common stock were declared for the year. Earnings in the last six months have been more than sufficient to pay both disbursements. The company is free of indebtedness.

F. W. Treadway was elected president; E. J. Bartlett, first vice-president and general manager; E. J. Stahl, second vice-president; W. C. Fischer, treasurer, and W. P. Southard, secretary. The following directors were chosen: F. W. Treadway, E. J. Bartlett, E. J. Stahl, W. D. Fischer, D. Z. Norton, J. H. Wade, F. R. White, John R. Raible and John A. Kling.

An industrial lift truck, a new product, has met with hearty support, it was reported. By means of it a load may be lifted 72 inches.

Factories Hampered by Lack of Bodies

(Continued from page 994)

nounced increase in production of this type of vehicle. The truck industry, in general, while not making rapid strides, is going forward at a steady pace and bringing the production factories to a higher scale of operations.

The low mark in tire output for the year was reached during October, but production is increasing slightly and will continue to advance with the object in view of not only building up finished goods inventories but preparing for the spring demand. Advices from London on crude rubber restriction have allayed somewhat the fear that it will mean ultimately an increased cost of tires. Nevertheless, there is an undercurrent of feeling that with rubber output restricted and being quoted higher than heretofore and with advances made in the price of cotton used in tire fabric the price of the finished tire must be affected

Rice Returns Home After Foreign Trip

Discussed Tariff, Conferred with G. M. Representatives and Visited Shows

NEW YORK, Nov. 15—H. H. Rice, president of the Cadillac Motor Car Co., and also treasurer of the National Automobile Chamber of Commerce, returned on the Majestic from a long European trip, during which he visited both the French and English shows, held conferences with General Motors foreign representatives and distributors and discussed the American tariff with some of the foreign car manufacturers.

Returning with him were E. W. Seaholm, Cadillac engineer; E. A. DeWaters, Buick engineer, and C. R. Short of the General Motors Research Department. R. S. McLaughlin, head of General Motors Canadian plants, who was in the party, followed on another steamer.

Tariff Discussed Abroad

In speaking of his trip, Rice said:

Our new tariff was a matter of great interest abroad and the subject of considerable discussion. I found sentiment divided but it would seem to me that we are making progress and that it is possible that a uniform tariff will prevail eventually. I noted in Paris several newspaper articles advocating that the French government take action and reduce the French duty in accordance with the American.

Our duty provides for 25 per cent with those countries reciprocating. It works automatically in that when a car manufacturing nation meets our 25 per cent duty we give the same rates. The President of the United States does not have to take any formal action. At the present time Belgium, Spain and Switzerland are below the 25 per cent. England charges 33⅓ per cent and France 45.

I found both shows interesting indeed. From an engineering viewpoint Paris probably was the better because there many chassis were shown while the English ran more to displays of finished vehicles. Another phase was that for the first time since the war the engineers had a chance to show the new things upon which they have been working.

Taxes Force Small Cars

In England they are turning to the smaller models because of taxation. The British, I find, feel that the government should change the horsepower tax and I believe they would be only too glad to accept a gasoline tax in its place. Manufacturers would rather have it because of the sales resistance which develops with a horsepower tax where the full amount has to be paid at once. With two or three cents a gallon gasoline tax, the owner does not seem to feel it so much and this sales resistance is reduced.

While gasoline plays so important a part in the British motorist's life, still I find that the English engineers have not paid so much attention to carburetion as we have over here. In the first place they get better gasoline because of the high price of motor fuel over there and then again the English will permit an engine to run long enough to warm up before starting whereas over here we expect it to start functioning properly almost immediately.

There were General Motors dinners held during the French and English shows, which were attended by our distributors. Lots of enthusiasm was displayed at these affairs and the business outlook was declared excellent.

Creditors Wish Receiver to Continue Syra-Cord

SYRACUSE, N. Y., Nov. 14—Creditors of the Syracuse Rubber Co., which recently went into the hands of a receiver, will make every effort to save the firm by reorganization. E. A. Pam of Fred Stern & Co. of New York has been appointed chairman of a creditors' committee to take up reorganization projects. Other members of the committee are Adolphe Ernest of Thornett & Fehr, New York City; F. C. Chamberlin of the William Whitman Co. of Coston, and J. W. Clark of the Jenks Spinning Co. of Pawtucket, R. I. The combined claims of these concerns exceed $100,000.

Approximately $250,000 additional capital will be necessary to effect a reorganization, the creditors believe, for the company's liabilities amount to about $450,000, with assets of $360,000. None of the creditors is said to favor liquidation of the company, and a petition will be sent to Federal Judge Cooper asking permission for the receiver, William F. Raferty, to continue the business.

Milk Shippers Hear Fenn Argue Trucks

(*Continued from page* 998)

the second, such items as cost of oil, gasoline, tires, parts, repairs, etc.

Another big saving factor, he said, is to be found in standardization, securing mechanical units, spare parts and supplies that can be interchangeable. This enables purchases to be made in quantities, promotes labor saving and helps to develop a trained personnel, capable of giving the same efficient service wherever the standardization practice is in force. This systematic practice should be extended to periodical inspection of all equipment and daily reports rendered to the person in charge of inspections.

Answering the contention that the motor trucks should pay more in taxes for the support of highways, Fenn stated that motor cars and trucks are now paying $350,000,000 yearly to the Government for this object, or about one-half of the total maintenance cost.

UNION TRUCK TO BE SOLD

DETROIT, Nov. 15—Property of the Union Motor Truck Co. of Bay City will be sold by the referee in bankruptcy on Dec. 12. The plan of the former stockholders to reorganize was abandoned when it was shown that one-fifth of the $100,000 raised would be required to pay the fees of trustees and receiver and court costs.

Month Runs Strong in New York Trade

Slump in Open Car Sales Offset by Good Demand for Closed Models

NEW YORK, Nov. 14—There is little evidence of a seasonal slump in passenger car sales in the metropolitan district. Present indications are that sales for November will closely approximate the totals for October. Open car sales have undergone a seasonal slump, but the strong demand for closed models has counterbalanced any losses from this reason.

In some lines closed car sales are being materially hampered by the inability of dealers to get cars from the factory. Open cars, in most cases, are available for immediate delivery, although dealers do not expect to start stocking for spring delivery until next month or perhaps not before January.

Closed Cars Most in Demand

In the low and medium-price classes there has been no noticeable slump. Closed cars represent about three-quarters of the sales. In the higher price ranges there has been some falling off in sales, but, at that, the volume is satisfactory for this season of the year.

The monthly sales analysis published by Sherlock & Arnold shows that in the low and medium-price ranges October sales were less than 2 per cent behind September, and in the high-price class sales during October were about 30 per cent ahead of September. Total sales for all price classes in October were greater than in September. As compared with October, 1921, October of this year shows an increase of about 30 per cent.

A summary of registrations for the first ten months of the year is as follows:

	Medium and Low Price	High Price
January	2,014	283
February	2,230	273
March	6,352	632
April	8,428	862
May	8,467	961
June	8,203	865
July	7,816	678
August	5,921	516
September	4,592	511
October	4,518	665
Total	58,541	6,246

HIGH PRICE CARS SELLING

DETROIT, Nov. 14—Verne E. Burnett, advertising manager of the Cadillac Motor Car Co., following a trip through New England and the Middle Atlantic States, reports sales of better priced automobiles in that territory to be running high. Conditions were quiet in some cities, he said, but in others dealers were having the largest business they have ever had. A large number of medium-price car owners are graduating into the better priced car class, he said.

Dort Tours Country and Speeds Up Plant

Company Executives Convinced of Soundness of General Demand for Cars

FLINT, Nov. 14—That the problem of the automobile industry in 1923 will be one of production and not one of selling is the conviction of Dort executives who have completed tours to distributing points throughout the country, and who during Dort Introductory Week met hundreds of dealers in all sections.

J. Dallas Dort, president of the company, visited the chief distributing points in the East. John D. Mansfield, general sales manager, and Sam C. Mitchell, special sales representative, had an itinerary that included the larger cities of the Middle West and Northwest, while Wesley Buck, Dort sales engineer, was routed through the Far West.

That the executives were convinced of the soundness of the country's automobile demand and its permanency is indicated by the fact that immediately after their arrival in Flint plans went forward for steadily increasing production in the Dort factories at Flint and Kalamazoo.

Minerva, Citroen Become Identified with New Mors

PARIS, Nov. 4 (*by mail*)—Minerva and Citroen interests are to be found in the reorganized Mors Automobile Co., with a capital of 5,000,000 francs. The managing directors are Andre Citroen, Sylvain De Jong, of the Belgian Minerva Co., and Gustave Clement-Bayard.

The Mors company is building two types of cars in its Paris factory, with Knight sleeve valve engines produced by the Belgian Minerva Co. By reason of this arrangement Minerva cars will be marketed in France and its colonies by the Mors company, thus avoiding the 45 per cent import duty against foreign cars.

Motor Vehicle Looms Big in Russian Development

NEW YORK, Nov. 13—The following excerpt of a dispatch from Berlin outlining trade conditions in Russia is published in a recent issue of the Foreign Trade supplement of the London Times, copies of which have just reached this city:

A development which also deserves close observation is the growth of Russian motor transport services, which the cooperative services are making great efforts to extend. Though railway traffic is improving slightly, it is unequal to the requirements and the automobile is beginning to play an important part in the general transport of the country.

Some inquiries from the Russian cooperative associations have been reported by New York exporters of automotive equipment, and there, likewise, has been some effort on the part of Finnish merchants to interest American automotive exporters on proposals to make shipments of cars, trucks and accessories into Russia through Finland. Little actual business, however, is believed to have developed, although several manufacturers and exporters are closely watching the turn of events in Russia with the hope that trading may ultimately develop, perhaps on a large scale.

FINANCIAL NOTES

Wisconsin Cylinder Foundry Co. of Racine, Wis., has increased its capitalization from $50,000 to $75,000, for the purpose of building and equipping plant extensions needed to handle the rapidly increasing volume of orders for gas engine cylinder castings. The concern specialized in cylinder castings for high grade motor car power units and has been operating at maximum capacity for many months.

Keystone Tire & Rubber Co. reports net sales of $543,955 for the six months ending June 30 and a deficit of $161,385 after all charges and other deductions. The profit and loss deficit on June 30 amounted to $1,629,514.

Prairie du Chien (Wis.) Tool Co., maker of wrenches, tools and hardware specialties, has increased its capital stock from $50,000 to $100,000, in order to finance the enlargement of its plant and production.

J. I. Case Threshing Machine Co. has declared the regular quarterly dividend of $1.75 a share on the preferred stock, payable Jan. 1 to stockholders of record Dec. 11.

Willys Corp. has just paid creditors 40 per cent of all its indebtedness. It is expected that another substantial dividend will be paid at an early date.

Wright Aeronautical Corp. reports net sales of $497,487 and net profits, after taxes, of $118,943 for the quarter ending Sept. 30.

Stewart-Warner Speedometer Corp. has called a special directors meeting to declare an extra cash dividend.

Timken Detroit Axle Co. has declared a stock dividend of 150 per cent.

New Specifications Rule Purchases by Government

NEW YORK, Nov. 16—The American Engineering Standards Committee announces that an agreement has been reached with the Federal Specification Board which will make it possible for various industries to co-operate with the board in the formulation of specifications for material purchased by the Government.

By bringing these specifications into close agreement with commercial practice, it is expected that the price paid by the Government will be materially decreased in most cases. Among the specifications already adopted by the Federal Board, which will be reviewed and possibly revised within a year, are those covering petroleum products and tires, both solid and pneumatic, as well as inner tubes.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

Last week rates for call loans ranged between 5 per cent and 6 per cent, as compared with 4½ per cent and 6 per cent in the preceding week. The calling of funds by interior banks seemed to be the principal factor in the tendency toward firmness. The same general trend was shown in the time money market. The rate for all maturities from sixty days to six months advanced from 5 to 5½ per cent, as compared with 4¾ to 5 per cent. The market in general was comparatively quiet. The prime commercial rate was 4½ per cent to 4¾ per cent, as compared with 4½ per cent in the preceding week.

The number of business failures, 1078 in October, was smaller, with the exception of February, than for any month this year to date. Liabilities involved, $34,647,000, constituted the smallest amount for any month since June, 1921.

The unfilled orders on the books of the United States Steel Corp., as of Oct. 31, totaled 6,902,287 tons, which represents an increase for the month of 210,680 tons. The forward business now on the books of the corporation is the largest amount reported since February of last year.

Pig iron output for October totaled 2,637,844 tons, a gain of 29 per cent over September's output, and was the largest monthly output since December, 1920.

A favorable factor in the general business situation is found in the car loadings for the week ended Oct. 28, 1922, which totaled 1,014,480 cars, the largest amount loaded for any week, except the one ended Oct. 15, 1920, in the history of American railroads. It was also the second consecutive week that car loadings have exceeded the million mark.

The Federal Reserve statement as of Nov. 8 showed an increase of $2,706,000 in gold reserves, but a decrease of $463,000 in total reserves. Bills on hand increased $50,646,000, and total earning assets increased $36,927,000. Total deposits decreased $51,560,000.

BARLEY EXPORT CORP. FORMED

NEW YORK, Nov. 15—The Barley-Roamer Export Corp., with offices in the Fisk Building, 250 West 57th Street, has been organized to handle the export sales of the Roamer and the new Barley light six lines. H. A. Reed, formerly of the Robertson-Cole Co., is president of the new concern. Reed will continue to direct the export sales of Kelly-Springfield tires.

BRYAN TO EXPAND

FORT WAYNE, IND., Nov. 14—On account of the increasing interest being taken in the development of the Bryan light steam tractor, the Bryan Harvester Co., Inc., of Peru, Ind., is considering the erection of another plant, and this city is being seriously considered as a site.

INDUSTRIAL NOTES

J. L. Austin Manufacturing Co., Milwaukee, established within the past year to manufacture tool grinders and other shop specialties, will relocate in Menomonee Falls, Wis. The president and general manager is J. L. Austin, formerly with the Luther Grinder Manufacturing Co., Milwaukee. C. A. Reuter, formerly production man with the T. L. Smith Co., concrete mixers, is secretary and treasurer. A. Waecker, until recently with the Chain Belt Co., is works manager. William Bennett is vice-president and sales manager.

Col-O-Hi Battery Co. has been capitalized in Columbus for $100,000 to manufacture storage, starting and lighting batteries. The concern has been in business for about a year as a part of the business of the Ohio Tractor Co. Incorporators are H. S. Ballard, Hanby R. Jones, R. H. O'Brien, R. E. Rathmell and W. J. Ford. Organization has been effected by the election of W. H. Hoagland as president, Clarence Wilcox, secretary and J. D. Saley, general manager.

Westinghouse Electric & Manufacturing Co. continues to run strong on automotive equipment. The feeder shops are running full night and day shifts and the regular machine department of the automotive division is working overtime. Sales through the dealers have run heavy for the past six months, and new orders received recently from the Hupp, Gardner, Anderson and other manufacturing companies contribute to keep up production volume.

Hoyt Metal Co. of St. Louis, has secured the manufacturing and sales rights for Radiated bearings by arrangement with Radiated Bearings, Inc. of Chicago. The outstanding feature of the Radiated bearing consists in the provision of radiating members formed integral with or attached to the bearing proper. Louis E. Clarke and James B. Watson have been appointed to assist in introducing the bearings to the industry.

W. M. Simpson, president and general manager of the Knoxville, Tenn., branch of the One Heat Tire Co., of South Bend, Ind., which now has under construction at Knoxville a branch plant for the manufacture of tires, advises that machinery is being installed and operations will begin in the plant the early part of December. The principal product of the Knoxville plant will be a cord tire.

Morrison Metal Stamping Co. has been formed in Jackson to produce stampings for automobiles and wheels. Plans for the erection of a factory are now under way. The company is incorporated for $250,000. G. E. Morrison, for 12 years in the metal stamping business in Cleveland, is head of the new organization. Plant operation will start in January.

H. M. Jerome, formerly sales manager of the B. L. Schmidt Co., of Davenport, Iowa, has purchased the Norman Piston Ring Corp. of Peoria Heights, Ill., and will erect a factory at Battendorf, near Davenport. He will be president of the new company. The company manufactures the Norman piston ring.

B. L. Schmidt Co. of Davenport, Iowa, has changed its name to Micro Machine Co. H. H. Yerk has been appointed sales manager to succeed H. M. Jerome. The company manufactures the Micro internal grinder.

GOVERNMENT OFFERS TO REVISE MAIL LIST

WASHINGTON, Nov. 13—Sales managers, advertising managers and other department chiefs in the automotive industry who use the United States mails in their campaigns can profit by the Government's latest offer to correct and revise their mailing lists for 60 cents an hour.

This offer is made by order of Postmaster-General Work, who sees great economic waste in the use of antiquated mailing lists by business concerns sending out advertising matter and circular letters. Besides the delays undergone by the postal machinery in handling and re-handling vast quantities of this class of mail, which is incorrectly addressed in most instances, the loss suffered by large users of mail runs into thousands of dollars annually.

Ruckstell Axle Plant, at Berkeley, Cal., making a two-speed axle for Fords, has found its growing business demands larger space, and is increasing the size of the factory to nearly double its present capacity.

G. M. Directors Declare Special Common Dividend

NEW YORK, Nov. 16—At a meeting of the directors of the General Motors Corp. held to day a special dividend of 50 cents a share was declared to common stockholders of record at the close of business Nov. 27, 1922, payable on Dec. 20, 1922, out of this year's earnings.

The net earnings of the corporation for the calendar year 1922 after deducting all charges, including depreciation and Federal taxes, it is estimated, will be in excess of $55,000,000. Accordingly, after providing for dividends on the preferred and debenture stock and the dividend of 50 cents per share which has been declared on the common, the corporation will be enabled to carry to surplus an amount in excess of $40,000,000 at the end of the year.

The corporation has materially fortified its position and the outlook for the year 1923 is considered entirely satisfactory. It was decided, nevertheless, to take no action at this time in the direction of placing the common stock on a regular quarterly dividend basis, the directors being of the opinion that, however encouraging the outlook appears to be, the consideration of the question of resuming regular dividends on the common stock should be deferred until the results and capital requirements of future operations can be satisfactorily ascertained.

PHILADELPHIA TRADE ACTIVE

PHILADELPHIA, Nov. 11—Automobile distributers and dealers here report an active trade for the week just ended, with demand principally for closed cars.

METAL MARKETS

The one really bright spot in the steel markets continues to be the demand from the automotive industries. It is in the specialty products, such as alloy steels, cold-drawn steel bars, strip steel, bands, full-finished automobile sheets, etc., that the steady quota of absorption by the automotive industries is most impressive, this perhaps all the more so as none of the tonnages involved in individual orders and shipments is abnormally heavy. It is because the automotive industries as a whole furnish sustenance to the steel producers at a time of the year when demand from other steel consuming industries tapers off sharply that the importance of the automotive industries as a highly profitable outlet for the products of the steel mills stands out all the more emphatically.

On the whole, however, new business coming forward is so light that it has no effect on prices. The nearer we come to the end of the year and the beginning of a new one, the more eagerly steel consumers look for concrete action with reference to prices so that they can formulate their own plans and map out at least a tentative buying policy. Conditions in the steel industry, however, are such that those who set the pace must needs grope their way. Unless production can be materially increased, the recent bulge in costs operates against the possibility of downward readjustment of prices with a view to encouraging enlarged demand. At the present time there is no indication that consuming demand will broaden of itself.

In fact, the relatively heavy production of steel ingots in October can by no means be interpreted to signify correspondingly heavy consumption. It is fair to assume that steel stocks or surplus have become a factor that must be reckoned with. There remains but one possibility as to the future course of the steel market for consideration—price advances. These may be forced on the steel market by untoward circumstances, but, if so, they will only be a makeshift. The leaders of the steel industry recognize that a return to really normal conditions is only possible on the basis of further deflation, but such deflation waits upon the restoration of equitable conditions in the labor market and other factors beyond the steel industry's control.

Pig Iron.—It looks as though the only obstacle in the way of further declines was the lack of transactions by which to gauge the shrinkage in values.

Aluminum.—It is current gossip in the market that the domestic producer began to quote aluminum ingots 1c. a pound higher on November 1, bringing the price to 22c. for 98 @ 99 per cent and 23c. for 99 per cent pure virgin metal. This facilitates competition by importers and a very large business in British, French and Swiss metal is said to have been done in the last few days. When it comes to sheets, however, the situation is different. The demand is far in excess of the domestic rolling capacity, but the high duty precludes importations on anything like a worth while scale. The domestic producer considers its prices and price policy a private affair, but from consumers it is learned that regular customers are being given every possible consideration.

Copper.—Easy conditions prevail in the market for raw copper but wrought copper products are firm.

Calendar

SHOWS

Dec. 3-9—New York, Eighteenth Annual Automobile Salon, Commodore Hotel.

Jan. 6-13—New York, National Automobile Show, Grand Central Palace, under auspices of National Automobile Chamber of Commerce.

Jan. 8 - 13 — New York, Second National Automobile Body Builders Show, Twelfth Regiment Armory, under the auspices of the Automobile Body Builders Association.

Jan. 27-Feb. 3—Chicago, Annual Automobile Salon.

Jan. 27 - Feb. 3 — Chicago, National Automobile Show, under auspices of National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

FOREIGN SHOWS

Nov. 3 - 11 — London (Olympia), Automobile Show.

Nov. 9 - 19 — Buenos Aires, Argentina, Annual Exhibition. Automovil Club Argentino.

Nov. 29-Dec. 4—London (Olympia), Cycle and Motorcycle Show. British Cycle Motors, The Tower, Warwick Road, Coventry.

Dec. 15 - Jan. 2 — Paris, Aeronautical Salon, Grand Palace. Chambre Syndicale des Industries Aeronautiques, 9 Rue Anatole de la Forge.

Jan. 13-24 — Brussels, Sixteenth International Automobile and Cycle Exposition, Palais du Conquantenaire.

May - July, 1923 — Gothenburg, Sweden, International Automobile Exhibition, Sponsored by the Royal Automobile Club of Sweden.

RACES

May 10 — Berlin - Grunewald, German Grand Prix.

CONVENTIONS

Dec. 6-8—St. Louis, Third Annual Meeting of the American Petroleum Institute, Hotel Statler.

Jan. 15-19—Chicago, Thirteenth American Good Roads Congress and Fourteenth National Good Roads Show.

Jan. 29 - 31 — Chicago, Annual Meeting, Automobile Electric Service Association, Congress Hotel.

S. A. E. MEETINGS

Metropolitan Section

Dec. 14 — Speaker, Charles P. Grimes, Research Engineer, H. H. Franklin Manufacturing Co.; Subject, Air Cooling in Automotive Engines.

March 15—Speaker, William P. Kennedy, President, Kennedy Engineering Corp.; Subject, Trolley Buses and Flexible Vehicles for Street Railway Service.

April 19—Speaker, Edw. E. La Schum, General Superintendent, Motor Vehicle Equipment, American Railway Express Co.; Subject, Engineering Features of Fleet Operation.

May 17—Speaker, F. P. Gilligan, Secretary, Henry Souther Engineering Co., Subject, Metallic Materials for Automotive Work.

Other Meetings

Jan. 9 - 12 — New York, Annual Meeting.

Jan. 31 — Chicago Meeting and Dinner of the Society at the Congress Hotel.

Britain Gets Lower Tariff from Spain

WASHINGTON, Nov. 14—Sharp reduction in tariff duties on automobiles, chassis, accessories, motorcycles and tires shipped into Spain are provided in a commercial treaty ratified between Great Britain and Spain, according to a cablegram received by the Department of Commerce from Commercial Attaché Charles H. Cunningham, Madrid.

Great Britain has agreed to admit free of duty from Spain for three years, the term of the treaty, Spanish mineral ore, along with other products, and Spain has agreed to a minimum importation of 750,000 tons of pit coal at a duty of 4 pesetas per ton instead of the regular second-column duty of 7.50 pesetas.

It is understood that the reductions in the Spanish duties are to be extended also to similar products from other countries having a most-favored-nation status with Spain and, inasmuch as this includes the United States, it is to be expected that the automotive industries in this country will share in the benefits of such a treaty through ratification.

How Reductions Stand

Among reductions below the second column provided in the British-Spanish treaty are the following:

Reduction of 5 to 10 per cent: Accessories for cycles and motorcycles.

Reductions of 15 to 20 per cent: Automobile, chassis with engine and complete automobiles of a value of more than 40,000 pesetas.

Reduction of more than 20,000: Internal combustion engines, driven by gas fuel and those driven by light liquid fuel (gasoline, alcohol, etc.), except such with more than two cylinders and weighing more than 1000 kilos (except articles previously specified); motorcycles with or without sidecar or special body for carrying goods.

Reduction of 10 per cent below second column: Automobiles, chassis with engine and complete automobiles of a value not exceeding 20,000 pesetas.

Reduction of 15 per cent: Automobiles, chassis with engine and complete automobiles of over 20,000 to 40,000 pesetas; motor and electric trucks; vehicles and trucks for carrying goods, motor buses, motor tank wagons and charabancs and framework with engine for trucks.

Other reductions include inner-tubes from 8 pesetas to 5.5 pesetas per kilo; outer tire covers, from 6 pesetas to 4 pesetas, and solid tires for carriages from 3.50 pesetas to 2.25 pesetas.

New Air Body Represents America Internationally

NEW YORK, Nov. 13—At the annual meeting of the Aero Club of America last night, the international representation with the Federation Aeronautique Internationale was turned over to the newly formed National Aeronautical Association, headed by Howard E. Coffin, thus making the association the official representative of aviation in America in all international affairs. The records of the recent aviation meet in Detroit were approved and will be forwarded to Europe for the approval of the F. A. I.

The affairs of the Aero Club were considerably clarified at the meeting. Court injunction had restrained Henry Woodhouse from attending or from attempting to hold an annual meeting of the club himself.

DISCREDIT PLANE STORY

WASHINGTON, Nov. 13—The "graft ring" story published in a New York daily paper which alleged that the Government is paying high prices for planes that are mechanically weak and cause fatalities among the Government flyers originated with Henry Woodhouse, former secretary of the Aero Club of America, the National Aeronautic Association alleges.

Woodhouse, N. A. A. officials claim, has no authority to speak for that organization.

Southeast in Best Condition in Years

ATLANTA, Nov. 14—According to the monthly business review of the Federal Reserve Bank of Atlanta, covering general conditions in the sixth district, which comprises the group of southeastern States, tractor and farm implement sales the past five months have increased steadily each month, with the exception of September as compared with August, the lack of gain then being due to the strike situation.

Each of the past five months, the report shows, has witnessed a considerable increase over the corresponding months of a year ago, with the outlook now for a steady volume of sales until next spring at least.

Recent big increases in cotton prices are having the result of increasing not only tractor and implement sales, but automobile and truck sales as well over the entire South, the bank's report shows. It is based on questionnaires filled out by the larger distributors in all southeastern States, including Atlanta, Birmingham and New Orleans.

That the manufacturers are looking forward to continued good business is indicated in reports from lumber mills that ash demand from the automobile trade has as yet experienced no abatement, and is in greater volume now than at any time this year.

Financially, the bank's report states, the Southeast is in better condition than it has been for years, due largely to the prosperous year experienced by agriculture.

GREENFIELD OUTLOOK BRIGHT

GREENFIELD, MASS., Nov. 15—At the meeting of the G. T. D. Engineering Club, President F. H. Payne of the Greenfield Tap & Die Corp. stated that prospects for the concern's business were bright and that the payroll, now numbering 940 employees, would soon exceed 1000.